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VIEWS, NEWS AND INTERVIEWS.

A curious coincidence is shown in the fact that a man named Shuttleworth has invented an electrical device for use on looms.

"All this fuss in the daily papers about the renewal of the contract between American Bell and Western Union reminds me of an old story," remarked a veteran. "You remember that a scientist once conceived the idea that if a very large number of men on the earth were to say 'Boo!' at the same time, the inhabitants of Mars might hear the noise and begin communication with us. Well, he arranged to have thousands of men all over the world speak the magic word at the same instant. When the appointed time came, the only man who said 'Boo!' was a deaf and dumb chap in Pekin, China. All the other fellows were waiting for some one else to say 'Boo!' first. The application of this story to the present case is that the daily press corresponds to the Pekin man, and—well, finish it any way you like."

A daily paper last week revived the story of a forthcoming union of the Manhattan Elevated and Metropolitan Traction companies in New York. President Vreeland, of the Traction company, and Russell Sage deny any knowledge of the plan.

James Carroll got a verdict of $1,625 last week in the County Court in Brooklyn, N. Y., in his suit against the Brooklyn Heights Railroad Company for injuries received at the hands of John Hall, a conductor. While Carroll was riding on a trolley car he became involved in a controversy with Conductor Hall for ejecting a boy who was peddling lemonade. Carroll alleged that the conductor then dragged him off the car and trounced him when they reached the sidewalk. In his charge to the jury, Judge Aspinall said that it is the duty of conductors to protect passengers and not assault them.

According to a contemporary, a workman who was knocked senseless by an electric shock at the foundry of the Anaconda Copper Mining Company, was resuscitated, after the usual expedients had failed, by removing his clothes, burying him in the foundry sand, except his mouth and nose, and thoroughly soaking the sand with a jet of water. The same experience, strangely enough, happened to the same man twice.

A friend sends to the *American Machinist* a clipping from a newspaper, which states that a young engineer has patented a remarkable invention, which, it is declared, removes the last vestige of risk of boiler explosions. The invention consists of some sort of an alarm which is sounded when the pressure reaches a certain point, and it is believed that the boiler insurance companies will insist upon its adoption. We have been possessed with the idea that a good safety valve, lifted from its seat every morning by the engineer, and known to be in good working order, is the very best sort of high-pressure alarm that can be attached to a boiler. It not only makes a noise when the maximum pressure is reached, but it also prevents the pressure getting beyond the maximum, and that, it seems to us, is the important function.

Great progress seems to be making in the use of hollow shafts for stationary steam engines. Twelve of these shafts are to be supplied to various street railway power plants in Chicago by the Bethlehem Iron Company.

The American Electric Meter Company, Betz Building, Philadelphia, have recently placed on the market a new three-wire system meter which requires to operate its pendulum about .4 of a watt for a 22-light meter. There would seem to be a field for this invention.

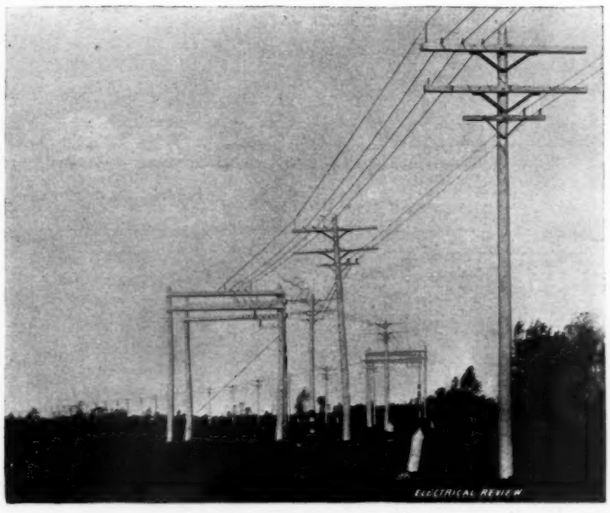

FIG 1.—A VIEW OF THE BUFFALO-NIAGARA FALLS ELECTRIC TRANSMISSION LINE, SHOWING METHOD OF TURNING CORNERS. THE CAPACITY OF THIS LINE IS 20,000 HORSE-POWER.—(See "Niagara Falls Power in Buffalo.")

NIAGARA FALLS POWER IN BUFFALO.

A Successful Test at Midnight, Sunday, in the Presence of the Officials.

ONE THOUSAND HORSE-POWER TRANSMITTED FROM THE NIAGARA FALLS POWER COMPANY'S GENERATORS TO THE BUFFALO RAILWAY COMPANY'S NIAGARA STREET STATION—A DESCRIPTION OF THE TRANSMISSION LINE AND ITS CONSTRUCTION—THE FIRST CURRENT SENT OVER THE LINE AT 8.57 O'CLOCK SUNDAY NIGHT, NOVEMBER 15 — ONE MINUTE AFTER MIDNIGHT POWER WAS DELIVERED AT BUFFALO AS AGREED — EVENT CELEBRATED WITH FIRING OF CANNON—MAYOR JEWETT AND ELECTRICAL OFFICIALS PRESENT.

[*Special Dispatch to the* ELECTRICAL REVIEW.]

BUFFALO, N. Y., November 15, 1896—When the Buffalo Railway Company some time ago made a contract for the delivery of 1,000 horse-power of electric current from the great plant at Niagara Falls, and this fact was announced, there were many skeptics who observed that it was not quite time to cancel orders for coal. The contract specified that 1,000 horse-power of current should be transmitted from the Falls to the Niagara street power house of the Buffalo Railway Company on or before November 15, 1896.

As the result of some unusually intelligent and rapid construction work on the part of the White-Crosby Company, of New York city, and in spite of annoying delays in the delivery of certain apparatus required on the line, the contract has been fulfilled in all requirements, and it only remains for the officers of the Cataract Power and Conduit Company and the

Buffalo Railway Company to decide when to turn the current on the line.

This will probably be done some time to-night. It is hoped and expected that everything will go off as smoothly as the launching of a ship, but it is deemed advisable to have one section of the Buffalo Railway Company's lines in readiness to receive current from the Falls alone, so that a more exact idea may be obtained as to how everything connected with the transmission of current will work. This can be best accomplished during the night hours.

The transmission line is 26 miles long and extends from the rear of the Niagara Falls Power Company's transformer house at the Falls to the Niagara street power house of the Buffalo Railway Company. The exact route of the line is as follows:

Northerly side of Adams avenue on the power company's property to a point one and one-half mile east of Sugar street, where it leaves Adams avenue and runs along the west side of the Niagara Junction Railway to a point 500 feet from the Mile Line road, where it turns at right angles and runs nearly east through the Power company's land and through farm lands to a point one mile north of La Salle. From this point it runs along the old Mile Line survey to Tonawanda Creek. It crosses Tonawanda Creek near Division street in Tonawanda and then passes southerly across the lands of the Buffalo, Thousand Islands & Portland Railroad to Ellicott Creek, which it crosses. Then it continues south to the southerly line of the village of Tonawanda. From this point it runs west for a mile and a quarter, where it strikes the east bank of the Erie Canal near Hinds street in the village of Tonawanda. From this point the line extends along the banks of the canal all the way to Buffalo.

A description of the line and the work involved in its construction may perhaps be more readily understood if the course of the current from the big generators at Niagara Falls to the railway power house is followed. A three-phase alternating current of 2,200 volts is carried from one of the big generators through a cable across the "Bridge of Sighs" to an air-tight chamber in the transformer house. These cables are here connected to two step-up transformers of 1,250 horse-power each, which transform the current up to 11,000 volts. The cables carrying this voltage are led to a marble switchboard situated near the transformers and provided with immense knife switches and fuses, whence the circuit passes to the pole line which begins immediately in the rear of the building.

This pole line is a work of art beside being an engineering feat of importance and magnitude. Many novel features are incorporated in its construction, which will no doubt be used with advantage in the construction of similar lines. The White-Crosby Company, to whose hands this important work was intrusted, were practically allowed *carte blanche* in the matter of expense, as the desire of the projectors of the line was that it should be of the very best construction and material, irrespective of cost.

Owing to the peculiar circumstances encountered in securing the right of way for the line, it was not possible to build it in a straight line, as would have been desirable. It followed, therefore, that a considerable number of angles and turns had to be provided for. That this has been done in a novel and most substantial manner will be apparent from the various illustrations shown herewith.

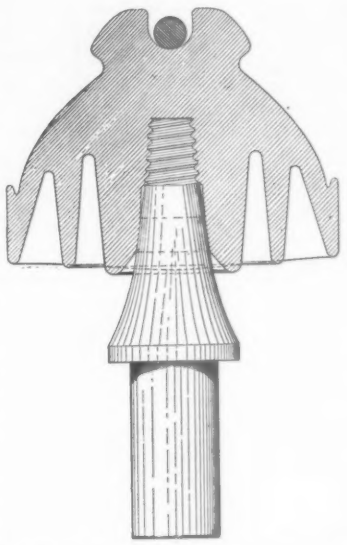

FIG. 2.—TYPE OF SPECIALLY DESIGNED PORCELAIN INSULATOR USED ON BUFFALO-NIAGARA FALLS ELECTRIC TRANSMISSION LINE.

There are about 2,100 poles in the line, ranging from 35 to 65 feet in height, from 15 to 30 inches in diameter at the base, and from 9 to 10 inches in diameter at the tops, set about 75 feet apart. They are of round cedar, shaved and painted. When the line is finished the color of the poles will be dark green. There are two large cross-arms provided for carrying the transmission line proper. These arms are of hard yellow heart pine, 4 by 6 inches by 12 feet, dressed, chamfered and painted. A radical departure in the bracing of these cross-arms has been designed by the White-Crosby Company. Instead of the usual flat iron braces attached to the pole and arm by lag bolts, a brace made of one piece of angle iron is used. As shown in the accompanying drawing, Fig. 3, this brace is fastened to the pole with one lag bolt. It is attached to the lower surface of the cross-arm, instead of on one side, as usual. It will be seen that such a brace, attached in the manner described, at once acts as a truss. Each brace weighs about 20 pounds, and is made of two and one-half by one-quarter-inch angle iron, formed hot and bored for lag bolts. The braces were made by the Cambria Iron Company, of Johnstown, Pa.

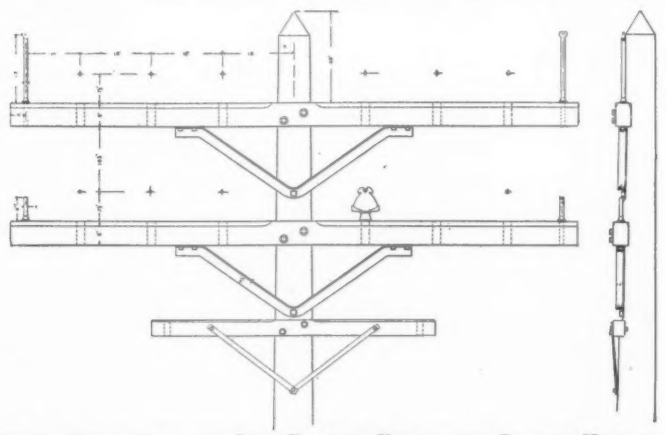

FIG. 3.—TOP OF POLE AND POLE FIXTURES USED ON THE BUFFALO-NIAGARA FALLS ELECTRIC TRANSMISSION LINE.

Below the two large cross-arms is a standard six-pin electric light arm bored for two pins. This is to carry a private metallic telephone line, which is now in process of construction. The smaller cross-arm is braced in the ordinary manner with flat irons. The drawing referred to before affords a good comparison of the two methods of bracing.

The pins shown on the extremities of the lower, long cross-arm are steel guards, to prevent any of the conductors from falling in case a tie-wire, pin or insulator breaks. The long steel pins on the top cross-arm are for a similar purpose, and also to carry the wire which will be used as a lightning conductor. Another conductor of the same kind is carried on top of the poles. At every fifth pole these lightning conductors are grounded to a coil of wire buried at the foot of the pole.

When the entire line is completed, it will have a capacity of 20,000 horse-power. As it is a three-phase line, each circuit will be composed of three conductors carrying 5,000 horse-power, or four circuits in all. To overcome the effects of induction, the various circuits composing the line are transposed from pole to pole. When the line is finished to its full capacity, the phase of this transportation will be such that the entire line will be shifted on five poles. The overhead portion of the line will be fenced in throughout its length.

A most important feature of this line is the special type of porcelain insulators used. These were designed especially for this work by the White-Crosby Company, and have been manufactured by three separate concerns. The illustration, Fig. 2, shows one of these insulators attached to a cross-arm pin. The insulators are of the triple petticoat type, with unusually large surfaces and uniform strength. The design is so proportioned as to protect all weak points. Along the lower edge of the outside petticoat is a gutter designed to drain away water on each side of the cross-arm. The construction is such that icicles are compelled to form at but two points, both clear of the cross-arm.

Before being accepted for use on the line, the insulators used were subjected to an unusually rigorous test under the supervision of Mr. Paul M. Lincoln, electrical superintendent for the Niagara Falls Power Company. The tests were made to determine both the electrical resistance and to discover any possible mechanical defects in each individual piece. The method of testing was about as follows: The insulators were immersed in a salt water bath and a current of 40,000 volts from a transformer covered with oil was passed through each piece. It was found, after many experiments with both fresh water and salt water baths, that a great gain in the speed of making the tests was secured by using salt water. At the slightest sign of a defect of any kind, the insulator showing it was at once condemned. Although such a test may appear unusually severe for insulators designed to carry a circuit transmitting but 10,000 volts, it was deemed to be the wisest course to pursue, as it assured a large factor of safety.

As mentioned before, these porcelain insulators, which, by-the-way, weigh nearly 12 pounds apiece, were made by three separate concerns. It is but just to state that those manufactured by the Imperial Porcelain Works, of Trenton, N. J., passed the severe test with an unusually high record. Less than two-thirds of one per cent of one pattern of the insulators supplied by this firm failed to stand the test.

The overhead conductors used on the line are bare stranded copper, each 350,000 circular mils in diameter. Each conductor is formed of 19 No. 10 wires. For the present demands of the transmission line the American Electrical Works, of Providence, R. I., has supplied 66 miles of the bare conductors just described. The facilities which this concern has for turning out large orders for heavy wire enable it to produce a product uniform in all respects, both mechanically and electrically.

When the line is completed to its full capacity, each pole will carry a weight of 1,200 pounds of copper. The mechanical strains to which the poles and line may be subjected have been determined with great exactness. These calculations have been carried to the extent of assuming the whole line to be covered with one-half inch of ice. The staunchness of the line may be inferred when it is stated that when the writer inspected it to-day there was a wind of at least 40 miles an hour blowing across the line. Not the slightest tremor in a single pole could be discovered, and the vibrations of the three overhead conductors were barely visible. The only effect of this high wind was to produce the Aeolian sighing common to telephone and telegraph lines.

For a considerable part of its length the transmission line follows the bank of the Erie Canal. At a point about 4,200 feet north of the Buffalo Railway Company's power house the

overhead line stops, and from there to its end the line is carried under ground. The last pole on the line is about 35 feet high and 30 inches in diameter at the base. It is set in a bed of concrete about five feet in diameter and 10 feet deep. This pole is also heavily braced from the north, and the ends of the line are held firmly in place by double cross-arms with braces between them. The line descends from the pole in a slight curve and enters a neat brick terminal house at an upward slant through a slit in side of the house. Inside the house connections are made with the underground cables.

The subway carrying these cables is also laid along the bank of the canal at an average depth of about one and one-half foot. The subway is constructed of vitrified tile ducts, each having a single hole three inches in diameter. The subway is built up of 12 of these ducts laid in cement, with the joints suitably broken. There is at least four inches of concrete on all sides of the subway. With 12 ducts, the capacity of the subway is the same as that of the overhead line. After the whole 4,200 feet of subway had been laid, it was thoroughly inspected, and it was found that not a single tile had been broken in the course of construction. In only two places was it necessary to file out cement which had seeped through the joints. The tiles were made by the H. B. Camp Company, of Aultman, Ohio. There are 16 manholes along the line of the subway. They are octagonal in form, with an interior diameter of about five feet. The bottom is formed of six inches of concrete and one layer of brick, and the sides are brick walls one foot thick.

The three lines of cable now laid in the subway consist of a stranded copper core, 350,000 circular mils in diameter, covered with 9-16 of an inch pure rubber, two servings of rubber tape and a coating of lead. The diameter of the cable over all is one inch and a half. There are about 13,000 feet of cable now in the subway, all of which was furnished by the Safety Insulated Wire and Cable Company, of New York city, under rigid guarantees. The tests of this cable were made at Niagara Falls by Mr. Paul M. Lincoln, and it may be interesting to know that the cable in all cases successfully withstood a current of 40,000 volts, alternating. The method of making these tests permitted it to be positively known that at least 40,000 volts had no effect on the insulation. Mr. Lincoln carried the tests to an extreme, and finally succeeded in forming an arc between the lead covering and the core of the cable at a voltage which he estimates as between 80,000 and 100,000 volts.

The underground cables, as stated before, are carried 4,200 feet along the canal bank to a transformer house which has been built in the rear of the Niagara street power house of the Buffalo Railway Company. This is a one-story brick structure whose inside dimensions are 16 by 20 feet. At the rear of this room is a marble switchboard similar in character to the one at the Falls end of the line and similarly equipped. The cables are carried in the conduit under ground clear up to the switchboard. In the center of the room is an air-tight platform on which the three

FIG. 4.—BUFFALO-NIAGARA FALLS LINE—TERMINAL HOUSE WHERE UNDERGROUND CABLES BEGIN—POLE 30 INCHES IN DIAMETER.

step-down transformers stand. All the transformers were supplied by the General Electric Company. This room is equipped with a blower operated by an electric motor similar in character to the outfit at the Falls end of the line. The object of the blower is to drive a current of air inside the air-tight platform, whence it ascends through and around the transformers, thus helping to keep them cool. The lines are carried from the switchboard to the transformers and from them to the rotary

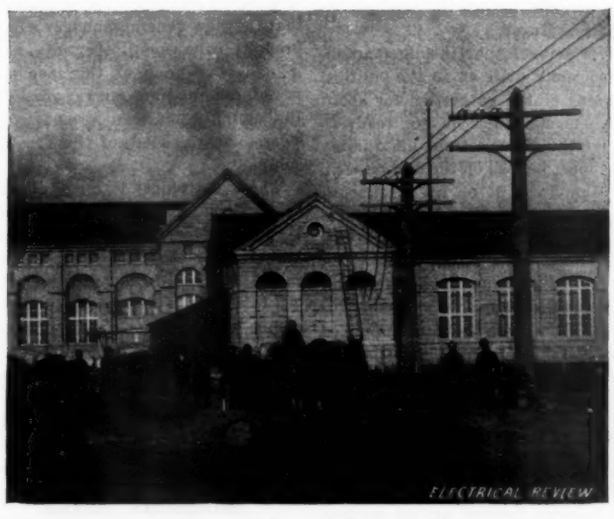

FIG. 5.—BUFFALO-NIAGARA FALLS LINE—WHERE LINE ENTERS POWER HOUSE, NIAGARA FALLS, N. Y.

converters located on the floor of the power house above. Each of these transformers is of 265 kilowatts capacity, and steps the current down from 10,700 volts to 370 volts. After these 370 volts of alternating current have passed through the rotary converters, it becomes 550 volts direct current, and is ready to send out over the electric railway lines. This, in brief, describes the various changes through which current generated at Niagara Falls passes before it is used to operate street cars in Buffalo, 26 miles away.

This transmission line has been built by the White-Crosby Company, of New York city, for the Cataract Construction Company, of which Mr. William A. Brackenridge is chief engineer. Mr. Brackenridge has been in charge of the construction work of the line on behalf of his company, and it was under his direction that the transformer house of the Niagara Falls Power Company was fitted for its part in the work described. When the line is completed, the Cataract Construction Company will turn it over to the Niagara Falls Power Company, whose final property it becomes.

The Niagara Falls Power Company will generate the current at the Falls and send it over the line to the city limits of Buffalo. Here it will be delivered to a sub-company of the Niagara Falls Power Company, known as the Cataract Power and Conduit Company. The latter is the distributing company in Buffalo. Its president is Mr. George Urban, Jr., and Mr. Charles R. Huntley is its vice-president and general manager. The capital of the company is $2,000,000, and its board of directors is as follows: E. D. Adams, John Jacob Astor, D. O. Mills, Daniel O'Day, William B. Rankine, Francis L. Stetson and Edward L. Wickes, of New York, and Charles R. Huntley and George Urban, Jr., of Buffalo.

The intense interest taken in the construction and successful opening of this line has been very marked in Buffalo and surrounding cities and towns. A large number of engineers, both electrical and mechanical, have visited the work during its progress and have expressed themselves as greatly surprised and pleased at the extent of the work and at the splendid ability shown in the designing and building of the line. There are thousands of men in the city of Buffalo who believe that the successful transmission of Niagara power to that city will be a most important factor in its future growth and prosperity. It is expected that this current will be sold within the city limits of Buffalo at a price below $40 per horse-power per annum. With such advantages as electric power offers, and with the civic enterprise and spirit which is a characteristic of Buffalo business men, it is expected that the growth of the city, at least on its manufacturing side, will from now on be very rapid.

A number of these gentlemen, prominent among them Messrs. George Urban, Jr., and Charles R. Huntley, are arranging to have a fitting celebration of the transmission of Niagara power to Buffalo at some future date, probably during the holidays. The exact time has not finally been decided upon.

As is well known, some of the most enterprising and far-seeing business men of the State, and some of the most able engineers, are connected with the Cataract Construction Company and the Niagara Falls Power Company. What their plans may be for the future extension of transmission lines from Niagara Falls to the surrounding cities and towns can not be ascertained, as they prefer to do their work in a quiet manner, without the help or advice of the public at large. It is safe to presume, however, that the line just completed is but the first of several which are yet to be built. The work on the extensive addition to the Niagara Falls Power Company's plant is well under way. When it is completed the plant will probably have sufficient capacity to supply all demands in the immediate vicinity of Niagara Falls, and enough to spare for any enterprising town or village within a reasonable radius which may apply for it. In the successful construction and operation of the line just opened, a splendid beginning toward this end has been made.

STEPHEN L. COLES.

LATER—THE TEST A SUCCESS.

BUFFALO, N. Y., 12.30 A. M., Nov. 16—The preliminary test was made at 8.57 P. M., Sunday, and at one minute past midnight this (Monday) morning the power was turned on at Niagara Falls and delivered in Buffalo, 26 miles distant. Mr. Emmet, of the General Electric Company, closed the switch. Cannon were fired and everybody rejoiced. The ELECTRICAL REVIEW representative noticed among those present at this early (or late) hour, Mayor Jewett, H. H. Littell, E. J. Hall, Col. H. M. Watson, Chas. R. Huntley and Geo. Urban, Jr.

S. L. C.

Telephones on the Buffalo-Niagara Falls Line.

After a competitive test of efficiency and durability, 52 instruments for out-of-door telephone use, made from a special design in inclosed iron boxes; 15 instruments of the standard long-distance type, and a 50-drop switchboard of the "Phœnix" construction, made by the Phœnix Interior Telephone Company, of New York, were accepted by the engineers and are now being installed along the line.

New York Electrical Society.

A meeting of the New York Electrical Society will be held at Columbia College, Madison avenue and Forty-ninth street, on Thursday, November 19, at 8 P. M. Mr. Joseph Sachs will deliver a lecture on "Horseless Carriages."

The lecture will cover the general principles involved, and review the progress made in European developments as well as in those of this country. The leading details and features of the various forms of horseless carriages will be pointed out, and special attention will be drawn to the most recent and improved examples in the art, including machines propelled by steam, gas, oil and electricity. The lecture will be illustrated by stereopticon. Ladies are invited.

TELEPHONE NEWS AND COMMENT.

The old rumor that the Postal Telegraph Cable Company is desirous of forming an alliance with the American Bell Telephone Company to the exclusion of Western Union was again revived last week.

The stockholders of the Southern New England Telephone Company have voted to increase the company's stock from $2,000,000 to $3,000,000. The money raised will be used in retiring convertible five per cent debentures and in extending and improving the plant.

The instrument statement of the American Bell Telephone Company for the month ended October 20 is as follows:

	1896.	1895.	1894.
Gross output	14,766	14,969	8,828
Returned	7,252	6,305	5,482
Net output	7,514	8,664	3,346
Since December 20:			
Gross output	163,161	143,192	71,206
Returned	75,799	67,815	59,128
Net output	87,362	75,377	12,079
Total outstanding	763,898	657,883	578,569

A Boston stockholder in the American Bell Telephone Company is quoted as saying: "It does not matter which way the Berliner case is decided, as far as the local telephone companies are concerned. If in favor of Bell, the local companies will be protected in the exclusive use of long-distance transmitters; if against Bell, the local companies will be looking for a further concession in royalties. It is said the New England and Erie companies now pay the Bell about $300,000 per annum. This would be a reduction in expenses to the local companies, which would increase the income of the Bell company, through their holdings in the local companies, and the concession on part of the Bell would not be missed."

A curious telephone incident occurred at Rock Dell, N. Y., last week. In some way the telephone wire had been cut, and, previous to repairing it, two young men of the vicinity undertook a novel experiment. One of them, Torger Anderson, went to the Rock Dell store, and the other, John Lindale, took an end of the broken wire in each hand. The two men set their watches alike, so there could be no mistake. Torger took down the receiver and rang up Oslo. Although Lindale received a shock, he kept hold of the wires, and the message was clearly conveyed through his body. In like manner, Torger Anderson telephoned to Dodge Centre and to Austin, and the message and replies were heard as clearly as though the wire wasn't mended with a human being. Lindale was four miles away from the store, and stayed there for 15 minutes, in accordance with the agreement.

Michigan Electric Company Gets a Big Order.

The Michigan Electric Company, of Detroit, is among the many electrical companies which have experienced renewed prosperity after the presidential campaign. Two days after Major McKinley's election this company took an order for a big plant which it otherwise would not have secured.

A Telephone Lineman's Election Joke.

To the Editor of Electrical Review:

A good telephone election story comes to me from one of the telephone companies in the northwest. It seems that arrangements had been made to transmit election bulletins to all of the country toll stations. In one small town the telephone agent was also proprietor of a hotel, there being but two in the place. The agent had invited in his friends and neighbors to hear the returns, and presumably at the same time to partake of his refreshments, liquid and otherwise, at the usual rates.

It so happened that in the night preceding election day there was a sleet storm in this neighborhood, and the telephone wires were badly broken down. A lineman was immediately despatched to repair this particular line, but was unable to finish the job before night, and the wires remained broken down within a mile or two of the village.

The man was obliged to go to the town, therefore, to put up over night, expecting to finish the work in the morning. He happened, however, to go to a rival hotel, being the only other one in the place and the one which did not have a telephone. Learning there of the preparations which had been made, he determined to perpetrate a telephone joke, presumably for his own entertainment. He therefore made from two cigar boxes and other material, a piece of apparatus which looked rather like a telephone, and ran to it some pieces of wire which were found, and which were made to extend out of the window and presumably to the telephone line. A blackboard was prepared, and the hotel man invited the populace to hear the returns.

It is evident that the lineman obtained some drift as to the political opinions of the gathering, for about nine o'clock, when he got ready to receive the returns from his dummy telephone, he read off the first bulletin and announced it on his blackboard amid tremendous cheers. This was to the effect that Bryan had carried New York by 200,000. The next bulletin gave the news that Michigan, Ohio and Pennsylvania were sure for Bryan. The third bulletin announced that there had been a land-slide for Bryan in Illinois, and the fourth bulletin was announced amid tremendous cheering, it being to the effect that Bryan was elected President. The meeting then broke up amid great enthusiasm.

The next day, it is needless to add, the lineman finished up his work as speedily as possible and got out of the neighborhood, and the telephone company received vigorous complaint from the bona-fide telephone agent that he had been "done" out of the returns, and his rival had reaped the entire benefit. I understand that it took some time to explain the matter to his satisfaction. The romancing lineman is now working in a different part of the State, but two old cigar boxes and a piece of fence wire remain in this small town up in the woods, where, for a few hours, in the opinion of the assembled villagers, Bryan was elected. A. S. H.

Chicago, November 12.

Union Traction Company Loses Manager Beetem.

Mr. J. R. Beetem, general manager of the Union Traction Company, presented his resignation to the board of directors of the company last week. This action on the part of Mr. Beetem was not unexpected, as for some time he has been considering the acceptance of a more important position with a street railway system in another city. With this fact in consideration the board of directors consented to accept the resignation. Mr. Beetem went to Philadelphia less than two years ago from Scranton, where he had reorganized the street railway system, and became general manager of the People's Traction system.

At the time of the street railway consolidation he was advanced to the position of general manager of the Union Traction Company. He is a hard and persistent worker, seldom away from his desk, and organized the Union system after a steam railroad model, personally superintending every detail of operation. The success of his management was shown in the very favorable financial report of the company at the end of the last fiscal year, notwithstanding the loss during the strike last December.

There is much speculation among financial men interested in the street railway systems of Philadelphia as to the man who will be appointed to succeed Mr. Beetem. Several men have been mentioned for the place, but as yet no appointment has been confirmed by the executive committee of the board of directors of the Union Traction Company. It is thought that the new general manager will be brought from some other city, as it is said that none of the men now prominent in street railway affairs in Philadelphia has been seriously considered by the heads of the Traction company.

There is a report to the effect that the position will be offered to John B. Parsons, formerly of Philadelphia, but who has been managing a street railway system in Chicago during the last few years. Color is given to this rumor by the presence of Mr. Parsons in Philadelphia. His appearance so soon after the resignation of the Traction company's general manager is regarded as a strong indication of his ultimate appointment to Mr. Beetem's position.

Metropolitan Traction.

A gentleman identified with the Metropolitan Traction Company, of New York city, is quoted as follows: Metropolitan Traction Company has 17 miles of cable road operated in New York city, which carry 635,000 persons daily, of whom 125,000 are transferred from connecting lines. These 17 miles carry three times as many people as are carried by the 250 miles of trolley road in Buffalo, and twice as many as the 200 miles in Brooklyn carry. It is 60 per cent more than the elevated system in New York, with its 34 miles, carried during the last quarter. Compare the cost of operations of the 34 miles of elevated road with the 17 miles of surface road, and the comparison is altogether in favor of the Traction company with its very much heavier receipts. It is a study of these conditions which should determine the relative value of the two properties.

Effect on the Skin of Exposure to Roentgen Tubes.

To the Editor of Electrical Review:

At intervals the Electrical Review has published accounts of burns and inflammations resulting from long exposure to Roentgen tubes. The subject is one whose importance is constantly increasing, and the experience of trustworthy investigators should receive early publication. This is more necessary since the use of Roentgen tubes for therapeutic and diagnostic purposes is becoming general, and experiments are being prosecuted by many, whose experience in physical manipulations is limited.

A remarkably clear case of this nature has just come under the observation of the writer. The patient had been exposed to the tube for periods of about two hours each on two consecutive days. During most of this time the tube had been placed within a few inches of the back, at the base of the dorsal region. In a few days an irritation and itching sensation were noticed. The skin over a considerable area had turned to a dark brown, or mahogany, color. A few days later the area had increased, and the skin grew very red and inflamed, but no blisters were noted. Other portions of the skin which had been exposed to the tube for only a short time were slightly tanned and somewhat hard and dry. In due time the skin peeled off where the burn had been most pronounced. The whole occurrence resembled a bad sun-burn. The patient had worn thin clothing during the exposure to the tube, and the tube in this case was of the focusing type, with a platinum impact plane.

The writer has also noticed that his hands have become tanned while working constantly with focusing tubes.

Enough has been so far developed in such connection to conclude that the effects are not due to the X rays, but rather to ultra-violet rays, which are always present to a greater or less extent. It is noteworthy that such effects only result from exposure to the focusing tubes, when, owing to the concentration of energy, ultra-violet rays of considerable intensity must be produced.

When pear-shaped tubes are used, in which the impact is extended over a large area of glass, no burns seem to result from even long exposure to powerfully excited tubes. This, however, is only stated as a matter of personal experience and observation. There may be other investigators who can state results to the contrary.

W. M. Stine.

Armour Institute of Technology, Chicago, Ill.

Odds and Ends of the St. Louis Street Railway Convention.

The Western Electric Company, Chicago, was represented at the St. Louis convention by Messrs. A. L. Tucker and T. G. Grier.

Paige Iron Works, Chicago, was represented at the St. Louis convention by the genial president, Mr. Alonzo W. Paige, and the engineer, Mr. E. S. Nethercut.

The Edward P. Allis company, Milwaukee, Wis., was represented at the St. Louis convention by Messrs. John B. Allan and Albert Hoppin. This company hasa very large clientele among street railway men.

Falk Manufacturing Company, Milwaukee, Wis., was represented at the St. Louis convention by Mr. E. A. Wurster, secretary and treasurer; Mr. Clement C. Smith, engineer, and Mr. Henry L. Prather, solicitor.

The Terre Haute Car and Manufacturing Company, Terre Haute, Ind., were represented at the St. Louis convention by Messrs. D. B. Dean and F. E. Colbert, sales agents, and Mr. Lewis J. Cox, president and treasurer.

Mr. H. L. Shippey, secretary and manager of John A. Roebling's Sons Company, was a very genial convention visitor until one of the local dailies spoke of him as Mr. H. L. "Sloppy," and his good nature turned to vinegar for a brief space.

The Cleveland Construction Company, of Akron, Ohio, were represented at the St. Louis convention by Mr. Will Christy and Mr. Frank J. J. Sloat. These gentlemen were also representatives of the Akron, Bedford & Cleveland Railroad Company.

During the recent street railway convention in St. Louis the *Republic*, of that city, published a column or two of interesting gossip, of which the following is an abstract:

Major Harry Evans is kicking. No one who knows him would believe it, but he has a grievance. He says: "This association is now more than 15 years old. I was created major at the first meeting. I am still major, and I ought to be promoted. Every one knows I have done my duty. At Atlanta last year I bought three silk hats and 18 chrysanthemums at $1 apiece. Last year I began drinking nothing but water, and shall continue in the same line until I win my promotion. I ought to be at least a colonel."

John Brill is looking for the newspaper man who referred to him as "the millionaire car builder." It cost him 10 cold bottles—large ones—before dinner yesterday.

Mr. W. J. Clarke, of New York, advertised for an office boy last week. The following is one of the replies he received: "Dear Sir—I want a job. I hain't got any father, or any mother. I hain't got no brothers nor no sisters. I'm an orphan and I've got to hustle. It just betes hell how hard times is." He got the job.

Mr. Russell B. Harrison, of Terre Haute, is one of the association members. He is the third of his line to hold the title of president. I first met the ex-prince at a ball game in Chicago, where I was introduced to him by John Wallace. I did not appreciate the dignity of his position, and asked him if he was a brother of Hughey Harrison. He straightened up to inform me that he had no brothers. Conversation ceased and I left after the next inning. Later Mr. Wallace told me the honor which he had thrust upon me by the introduction.

The most decided cosmopolitan among them all is Mr. H. L. Shippey, whose office is in his hat, and who represents the Roeblings in Russia, South Africa, Japan or any other place where bridges are to be built or electric cables needed. Mr. Shippey was in the Transvaal just previous to the Jamieson raid. He thinks any kind of a raid which would sweep the arrogant Boers from power would be justifiable.

An Electrical Broiler.

The National Electrical Manufacturing Company, of Milford, Ct., is placing on the market a serviceable and efficient line of electric car heaters and accessories. They are made in three styles—a panel heater, an outside panel heater and a cross-seat heater. During last Winter these heaters were tested on a number of the largest trolley roads in the United States and gave very satisfactory service. The National company has also brought out a neat form of electrical broiler, which is illustrated herewith. The top plate is of white enamel, absorbs no grease, and can be kept sweet and clean. The wires are not exposed, and the plate may be washed as often as desired. Therefore, the flavor of one kind of food is not tainted by that of another. The life of the broiler is guaranteed, and it is claimed to have one-third more cooking space and to consume 25 per cent less current than other broilers on the market.

NATIONAL ELECTRICAL MANUFACTURING COMPANY'S ELECTRICAL BROILER.

The Electrical Maintenance Company.

Some of the most artistic, fetching and convincing pamphlets ever issued by an electrical firm have recently been distributed by the Electrical Maintenance Company, 50 Broadway, New York city. This company devotes itself to looking after the health of electrical plants, under a contract with the owner. Their method of doing business is tersely described in a booklet called "A Blending of Interests," which will be sent free on request. Mr. S. A. Douglas, who is known to electrical people all over the country, is the managing director of the company.

President John E. Hudson, of the American Bell Telephone Company, stopped in New York city last week on his way to Boston from Washington, where he had been attending the arguments in the Berliner case.

Electric Railways.

Negotiations are pending for the sale of the Oswego Street Railway to a company of capitalists of New York city. The company is represented by R. K. Warren.

At the annual meeting of the Rockland, Mass., & Abington Street Railway Company the following directors were elected: M. N. Arnold, Judge Kelley, John Spence, C. N. Cobb, George O. Jenkins, E. P. Boynton and Henry B. Peirce.

It is reported that a Cleveland, Ohio, syndicate is to purchase the franchise of the street railroads in the larger European cities, with the intention of equipping them with American appliances and operating them after American ideas.

Among those reported to be connected with the syndicate are former Secretary of the Navy Whitney and Mr. Fred S. Pearson, the consulting engineer of the Metropolitan Traction Company, who is reported also to be the advising engineer of the big syndicate.

The syndicate of Philadelphia, Pa., capitalists, headed by George S. Gandy, formerly vice-president of the Electric Traction Company, which was organized to build country trolley roads, have decided to begin work at once on four new roads which have been projected.

At the annual meeting of the Newburgh, N. Y., & Walden Electric Railway Company the following officers were elected for the ensuing year: Benjamin Norton, president; directors, Alven S. Swan, Charles N. Finch, Wm. N. Tobias, E. J. Irwin, C. F. Franklin and Mr. Touch.

Active work will be started on the three links of the trolley road which are to connect New Brunswick, Bound Brook and Raritan. This is part of the projected New York & Philadelphia Traction Company system, which will later be extended south to Trenton and north through the Oranges.

At the annual meeting of the Bristol, Ct., & Plainville Tramway Company the old board of directors was re-elected and the officers were continued as follows: President, C. S. Treadway; secretary, A. J. Muzzy; treasurer, Morris L. Tiffany; superintendent and general manager, George F. Cockings.

A Philadelphia, Pa., syndicate is trying to interest a local capitalist in a scheme to build an electric railway from Chicopee through Fairview and Willimansett into that city. It is proposed to capitalize the road at $75,000. In the next few days application for a franchise will be made to the city government of Chicopee. C. C. Abbey, of Chicopee, Pa., is interested.

Surveys have been made for a new trolley road from Wilkesbarre, Pa., to Hazleton, and the gigantic scheme of building the road and connecting the various electric systems from Carbondale to Hazelton promises to be realized, thereby making the largest system of electric railroads in this country, if not in the world. The surveys were made by Engineer W. H. Sturdevant, of Wilkesbarre.

The Rochester, N. Y., & Irondequoit Electric Railway Company has elected the following directors: J. N. Beckley, Fred Cook, Max Brickner, Henry C. Brewster, William P. Ellwanger, Bernard Dunn, William C. Barry, Frank S. Upton, Jacob Gerling, Louis Griesheimer, Fred W. Smith, Haywood Hawks, Abram J. Katz, William Purcell, George Wilder; inspectors of elections, George H. Ellwanger, Edward J. Kelsey.

ELECTRIC LIGHT FLASHES.

A mortgage covering a bonded indebtedness of $600,000 on the Peninsular Electric Light Company, of Detroit, Mich., is in process of foreclosure in the Wayne Circuit Court.

The plant and business of the Kenosha, Wis., Gas and Electric Light Company has just been sold to E. G. Cowdery, until recently general superintendent of the Milwaukee Gas and Fuel Company.

Settlement has been made in the proceedings of the village of Hempstead, L. I., against the Ball Electric Light Company, the company paying $1,000 to Augustus N. Weller, counsel for the board, to affect a compromise.

The United Electric Light Company has put in a new generator at the Indian Orchard, Mass., plant and has contracted for seven others. Two water-wheels of 1,000 horse-power each have also been put in. The generators will have a capacity of 700 arc lights and 10,000 incandescent lamps.

An additional expense will be incurred next year under a clause in the electric light contract which contains a guarantee to light the city offices of Albany, N. Y., free of charge, but which requires the city to furnish the appliances and place the wires. This work probably will cost about $500.

The Richmond County Electric Lighting Company has applied to Justice Van Wyck for an injunction restraining the trustees of the village of Port Richmond, L. I., from revoking a franchise permitting the company to enter the village and supply the residents with electricity. The trustees claim that the company violated the conditions of the franchise by failing to furnish a copy of their plans for laying wires, etc.

Mr. C. S. Bradley, the well known electrical inventor, who has spent the last nine months in Europe, is expected to return to New York city next week.

Electrical Review

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Special Notice to Advertisers.

CHANGES for advertisements must be in this office by Friday noon for the following week's issue.

NEW ADVERTISEMENTS should be in the office not later than Saturday noon to insure publication the following week.

NEW YORK, NOV. 18, 1896.

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To the Electrical Manufacturer: If you have something to sell, now is the best time in many months to announce it. Don't, we beg of you, think for one moment that we are hinting.

There is a hard-working and earnest inventor and scientific investigator in New York city who has every reason to felicitate himself over the success of the Niagara Falls electric transmission. The Tesla polyphase system, the invention of which was first announced in these columns in 1888, made this great achievement possible. The result at Niagara will be of untold value to the development of the electrical field and the long-distance transmission of power.

THE BERLINER SUIT.

The argument in the Berliner transmitter suit was concluded before the United States Supreme Court last week, and decision is looked for this month.

Judge R. S. Taylor, of Fort Wayne, and Mr. Causten Browne, of Boston, appeared for the government, and Mr. Joseph H. Choate and Mr. F. P. Fish, of New York, appeared for the American Bell Telephone Company.

This litigation was begun by direction of Attorney-General Miller, near the close of President Harrison's administration, and had its origin in a suggestion made by Mr. Charles H. Aldrich, the then Solicitor-General of the United States.

The principal ground upon which the government asked the cancellation of the patent, as shown by the briefs, was the extraordinary delay in its issue by the Patent Office, which, it was claimed, was in effect a fraud upon the public. Berliner's original application for a transmitter was filed June 4, 1877; in 1878, the Bell company became the owner of the application. The patent was not issued until November, 1891, thus extending for 17 more years, to the extent that this patent affected the entire interest, the Bell company's monopoly of the telephone field. This would make a total period of 32 years.

The decision will be an important one, yet we do not believe that it will be as serious in its effect on either the independent companies or the Bell company as is generally supposed.

In reply to an inquiry, the ELECTRICAL REVIEW would state that the agreement between the Western Union Telegraph Company and the American Bell Telephone Company was made on the 10th day of November, 1879, but, according to one of the articles in the agreement, the contract went into effect on the first day of that month. The Bell company at that time was known as the National Bell Telephone Company, and the Western Union Telegraph Company signed the agreement for itself and for the Gold and Stock Telegraph Company, American Speaking Telephone Company, and the Harmonic Telegraph Company. The amount of royalty paid to the Western Union was 20 per cent upon the royalties received by the American Bell Telephone Company from its licensees. The contract was signed by Dr. Norvin Green, president, and A. R. Brewer, secretary, of the telegraph company, and by W. H. Forbes, president, George L. Bradley, treasurer, and Charles Eustis Hubbard, clerk, of the telephone company. The total amount of royalties paid under this agreement aggregated about $7,000,000.

ELECTRIC POWER FROM NIAGARA FALLS TO BUFFALO.

The transmission of commercial electric power generated at Niagara Falls, N. Y., to the city of Buffalo, nearly 30 miles distant, is at last an accomplished fact. Millions of money and many earnest months of scientific and practical labor have brought about this most stupendous result—marking a new era in electrical progress.

The ELECTRICAL REVIEW presents in this issue a description of the line connecting the Falls with Buffalo, and an account of the turning on of current. The latter event, owing to agreements that had been entered into, had to take place not later than the 15th, and with the proper observance of the Sabbath, and after a preliminary test about 9 P. M. on that day, the official opening of the line was made to occur immediately after midnight, November 16. The current was turned on and power demonstrated at the Buffalo end of the line in the presence of the Mayor of that city and a number of the prominent officials of the electrical companies interested. This was an early hour, but the importance of the occasion was recognized.

A staff representative was present for the ELECTRICAL REVIEW, apparently the only electrical journal in this country possessing an editor who could rise early enough to chronicle an event that occurred at 12.01 A. M.

We believe that the manufacturers and skilled engineers who contributed to the success of this long transmission line are deserving of the highest meed of praise. The work has been more than one for mere profit. It has been one in which all entered with zeal and enthusiasm, proud of the opportunity to assist in an achievement of such importance, and which will undoubtedly prove far-reaching in its influence. From the inception of the company and the adoption of the Tesla polyphase system to the letting and completion of the various construction contracts, there has been such an intense concentration and continuity of work as is seldom the case in such large undertakings.

We learn that there has been scarcely any change of plans since the work first began. From this day electric power generated by the Falls of Niagara will assuredly be delivered economically throughout a vast area in northern New York.

Buffalo, the queen city of the eastern lakes, may well appreciate what this means for her prosperity, and the presence of her Mayor at the opening of the line was a proper official recognition of the importance of the event.

THE FINANCIAL SIDE.

The week ending to-day was attended by developments in the financial and business world fully up to expectations. Sufficient time has now elapsed since the election to permit of some definite idea of the improvement that has occurred. The *Journal of Commerce*, the industrial authority of the city, estimates that approximately 300 mills have resumed, and that operations have been expanded in 235 more. The bearing of this upon the purchasing power of the masses is at once apparent. This expansion has been steady, and there is every reason to believe that it will continue. In fact, it has already progressed far enough to warrant further improvement, as it has created an increased demand for food products, clothing and supplies, and has also supplied the wherewith to pay for them. The most significant advance in prices has been recorded in copper, iron and steel. The first-named movement is of particular interest to electrical workers. The price of lake ingot is now 11⅛ to 11¼ cents. Very heavy sales for delivery next month were made at 11.15 cents. In pig iron —the industrial barometer—values have gone up 50 cents per ton. There have been enormous increases in deposits among the banks at commercial centers. Loans have expanded materially, and the demand for commercial paper at the close of the week, after having absorbed important amounts, was much heavier than the supply.

In the electrical field there has been much of unusual interest. Manufacturing companies report an almost phenomenal inquiry for goods of every description. This indicates that the necessities of electrical apparatus users, as well as the new enterprises in sight, are fully as great as has been estimated. Up to this time the improvement in the demand has been confined largely to the supply department. The lighting branch is expected to be the next in the field to experience a change for the better. It is doubtful if railroad business will reach maximum proportions much before January. That month is looked upon by manufacturers as being the heaviest of the year.

The large companies are taking a very sensible view of the matter, and do not propose to be led into any extravagance or rashness in the matter of accepting security or otherwise extending credit. They say that business for the year, up to date, has been less than during the corresponding period, and that they must enjoy a considerable period of activity before they are able to regard their finances on a better basis. When activity becomes general, the full benefits of the patent pool will then be seen. It will be a case in which there will be the minimum cutting to secure business that will have to be placed at practically any figures which manufacturers may name.

This patent pool, with an eye to future benefits—the idea being to make hay while the sun shines—has resumed negotiations with the Ft. Wayne people in earnest. These are said to have reached a more advanced stage than when discontinued last Summer.

If one-tenth of the bull news on General Electric that has been in circulation in speculative circles during the week were true, that company would shortly reach a permanent dividend basis and probably continue thereon. Nevertheless, there has been more or less truth in most of the stories. They are significant in that they indicate the buoyancy of feeling on the part of insiders.

The Manhattan Elevated Company commanded considerable attention in financial circles in the period under review, owing to the appearance of a very bad annual financial statement. It shows about 4 per cent earned and 6 per cent paid upon the stock. It is estimated that in 1896, fiscal year, it carried 35,000,000 passengers less than its banner year of 1893. The loss in surplus earnings in seven years has fallen from $2,556,508 to $1,203,228, a decrease of over 50 per cent. This is a tribute that has been paid to old-fogy notions and a supreme contempt for the wishes and comfort of the public. Directors were elected that are likely to co-operate in perpetuating this policy of ruin.

There is considerable agitation just now in financial circles favoring the use of the trolley in New York city on lines where horses are now employed. The railroads interested are, it is said, making an attempt to show that the use of this kind of a motor power is not as dangerous as the cable. It is possible the companies may consent to a 4-cent fare as an offset for the franchises.

Interesting developments of an amicable nature are reported in the direction of Western Union and Bell telephone. It is said that something may be made public by the end of the month.

The Edison Electric Illuminating Company of New York did a good business in October, its net earnings being $89,432, an increase of $25,393 as compared with the corresponding month of 1895. The gain was nearly 40 per cent. It was made possible, it is said, through the decreased cost of operating. For ten months the net earnings have been $837,208, and the increase, $105,803.

The Akron Street Railway and Illuminating Company shows a gain in net earnings for nine months ending September 30, as compared with the corresponding period in 1895, of $6,807. Because of extensive improvements, it is expected that the year 1897 will make a still better showing.

Electrical securities hardly sustained the advances recorded on Saturday of last week. This was because all the security markets experienced a natural reaction on profit taking. However, stocks like Western Union and General Electric displayed rather more strength than any of the others, and have, of late, undoubtedly been bought for higher values. General Electric ranged around 34, and Western Union ended the week between 88 and 89 after having crossed 90.

In Boston, Bell Telephone lost some 8 points, recovered 3 and closed at 205. It was quite active, comparatively speaking. Erie Telephone lost a net 1½ per cent and New England Telephone 1. In Philadelphia, Electric Storage Battery common closed the week unchanged, and the preferred lost 1½ point. Quotations on Westinghouse in Boston were 27 bid and 29 asked for the common, and 50½ bid and 51 asked for the preferred.

BAIN.

New York, Nov. 14.

OUR CANADIAN LETTER.

KASLO, B. C.—The by-law to grant a franchise for electric lighting to Alexander & Retallack has been defeated.

RAT PORTAGE, ONT.—The Keewatin Power Company will shortly resume the work of completing their water power here.

DANVILLE, QUE.—The Asbestos & Danville Railway Company is applying for power to build and operate an electric railway from Danville to Asbestos.

HAMILTON, ONT.—The Westinghouse company, the great manufacturer of railway safety appliances, has taken steps to establish a branch factory at Hamilton.

ST. JEROME, QUE.—The Northern Electric Railway Company (La Compagnie du Chemin de Fer Electrique du Nord) is applying to the Provincial Legislature for power to build an electric railway, from Montreal to St. Jerome, and through the northern townships.

QUEBEC, QUE.—The remainder of the rails from Chicago for the new electric railway company arrived here on Saturday by the Canadian Pacific Railroad. A large quantity of rails has also been ordered in London, England, for the completion of the Upper Town section of the road, and is expected early next Spring.

MONTREAL, QUE. — The annual statement of the Montreal Street Railway Company was made public on the Stock Exchange to-day. It shows the net profits during the past year to have been $462,106.79 as against $351,349.13 for last year. The gross receipts were $1,265,898.39.

The net earnings for the past year were $555,033.69, which is larger than the gross earnings in 1892, which at that time were $564,406.57. The expenses for the past year were 56.48 per cent as against 82.68 in 1892. It cost to operate the road last year, $710,864.70.

The balance of the profits, added to the surplus of this year, is $102,106.79. The number of passengers carried was 29,896,471.

MONTREAL, QUE.—The Montreal Street Railway Company is pushing the construction of its Guy street and Côte des Neiges line with vigor, and it is expected that the road will be in running order, at least as far as Sherbrooke street, well within the limit. The laying of the rails has commenced on the Point St. Charles end of the road, one track having already been built on Shearer between Centre and William streets.

The Royal Electric Company announces that contracts have been made for dams, water-wheels and electrical apparatus, to be completed and available for use by September 1, 1897, and that under such contracts work is now under way to convert the water power of the Richelieu River rapids at Chambly into electrical energy, with entirely satisfactory returns upon the capital invested at rates below what is otherwise possible, and such that customers can afford to very greatly increase its use.

MONTREAL, QUE.—Messrs. Casgrain, Saveny & Rirard, solicitors, have given notice that the Stadacona Water, Light and Power Company, a company incorporated by letters patent under the great seal of the Province of Quebec, will apply to the legislature of that province at its next session for the passage of an act granting to the said company the following rights and privileges:

1. The confirmation of the rights accorded to the company by the said letters patent.

2. The right to acquire, hold and administer concessions and system of waterworks, drainage, electric light and power, and other municipal public and private enterprises, and to dispose of same.

3. The right to issue debentures, etc., in connection with the said works, and to hypothecate the whole or part of their said properties in connection with the issue of such debentures and other powers.

J. A. C.

Montreal, November 10.

ASSIGNMENT OF THE J. H. M'EWEN MANUFACTURING COMPANY.

AN INTERVIEW WITH MANAGER ROBINSON.

The J. H. McEwen Manufacturing Company, makers of dynamos and electric machinery, of Ridgeway, Pa., with offices in the Havemeyer Building, New York, on Thursday, November 12, made a general assignment for the benefit of creditors. The assignees are J. H. McEwen and C. H. McCauley. The assignees expect at once to receive permission from the court for the resumption of operations to complete unfinished orders on hand.

Manager Robinson, who has in charge the sales for the entire output of the factories, said to a representative of the ELECTRICAL REVIEW: "The company's liabilities are not half the actual assets," adding, "The trouble is very temporary, and the receivership will be but for a short period only."

In answer to the question as to the reason for the assignment, Mr. Robinson said: "Six weeks ago, in the State of Pennsylvania alone, we had $50,000 owing us, which was then over 60 days—the assignment is due solely to poor collections." He mentioned also that he was not prepared to state the amounts of liabilities and assets.

Mr. Robinson said, in a general way, that for six months the shops had been running full time, and that at present the outlook for heavy orders in the near future was excellent.

STREET RAILWAY TRUCKS.

READ BEFORE THE AMERICAN STREET RAILWAY ASSOCIATION, ST. LOUIS, OCTOBER 20, 1896, BY JOHN N. AKARMAN.

After a long and expensive experience, it has at last been generally conceded that trucks are necessary for carrying a modern street car. The term truck in this case means the separate frame-work for holding the running gear of an electric car; namely, the wheels, springs, brakes, motors, etc. This being the case, the question arises as to what form or type of truck is best adapted to the purpose, and the object of this paper is to endeavor to give some hints to street railroad men which will enable them to solve this question themselves. In doing this, it will be necessary to explain the principles involved, the requirements of the service, and show where single and where double trucks are most desirable.

When motors were first placed upon street cars, it was believed that there was no necessity for special construction, or any marked departure from the prevailing horse-car practice. The idea of a separate truck had not even been conceived. We found Vandepoele placing his motors upon the front platform, and using chains and sprocket wheels to carry the power to the axle. The car carried the whole weight of the motor and load, and, in addition to its usual work, took all the strains of the propelling power. Sprague made a short step in advance and in the right direction by carrying his motor on links from the car body and resting one end through sleeves on the axle. This improvement preserved the distance always the same between the motor and the axle, but the rising and falling of the body imparted a racking motion to the motors, which was destructive to the cars. Both of these systems were radically wrong, and might have been known to be so, from a study of the steam coaches of 50 years ago, and from the steam wagons of 15 or 20 years previous. As a result, hard-riding cars were produced, which soon wore out. It was also found that a car body was put out of service whenever there was a necessity for any repairs to the motor or machinery.

It was at this point that the idea of a separate truck was thought of. It was not, however, thought of with any favor, as months were spent in an attempt to get an electric manufacturing company to try the new system and put a separate truck under the body of a four-wheeled car without success. The idea of a separate truck was first conceived about the year 1885, but it was not until the latter part of 1887 that, in its concrete form, it was put into operation.

The first truck consisted of a continuous upper cord made of bar iron in the form of a rectangle. Its purpose was to support the car body, the sills of which rested on its frame. The sides of this upper cord were reinforced by heavy oak sub-sills, to which the cord and the pedestals were both firmly bolted. This form of frame kept the body square and took many of the strains on itself; but it has been abandoned, and in abandoning and using separate bars, I think we have been drifting away from the best practice, for it had a very important advantage in preserving the squareness of the body and truck. In addition to this upper cord, there was a bar extending around the truck, to which the bottom of the boxes were fastened.

In all the early trucks the frame rested directly on the journal boxes. The jar and concussion which resulted crystallized the metal, injured the motors and made it impossible to keep bolts and nuts tight, and was the cause of a rapid destruction of the whole truck. A remedy became an imperative necessity; so elasticity or cushioning of some sort was resorted to, and the first effort in this direction was made by placing a thick piece of rubber upon the top of the journal box, between it and the axle-box frame. While the principle was right, the means employed was of little value. The rubber, at best, had only a trifling elasticity, and was not durable, and did not prevent the box from jolting.

Then a spiral spring was tried upon the top of the box. This was an improvement, as it had a certain amount of motion; but the space available over the box was so small that a very stiff spring had to be used—so stiff, in fact, was it necessary to make the springs, that they were but little better than the rubber. In many cases the springs used were so rigid that they were no better than the old uncushioned construction. It was found that springs in this position had the additional disadvantage of aggravating the rocking of the box from side to side; but by widening the box at the bottom, or adding ears so as to form spring seats, it was found possible to give each box two springs, one on each side, and of ample diameter and length, so that they would carry the load with ease and have sufficient motion. Thus placed, they had the advantage of carrying the box perfectly steady, preventing entirely the rocking and unsteady motion. (It should be noted here that the motors were carried on the truck, and were in no way attached to the car body nor connected with its motions.)

So far as I can learn, the first car body carried on a separate four-wheeled truck was run on the Scranton & Suburban Railway Company in Scranton, Pa. About the same time the Boston & Revere Beach Railway Company, in Massachusetts, had a car, the body of which was mounted upon a truck; from the frame of the latter the motor was carried in the modern fashion. This car was operated under the eyes of the officials of an electric railway company, who watched its operation from day to day with the most careful attention, and it required but a few weeks of service to demonstrate that the principle was a great one, and that a very important advance had been made that was to mark an era of success in the operation of electric cars.

These first trucks, although involving nearly all the essential features of the modern trucks, were by no means perfect, and the conditions of the service soon suggested modifications. The first of these was to make the removal of the wheels and axles as easy and practicable as they had been with the jaws and oil boxes used on the old horse cars. The form which the improvement took was the making of the jaws a part of the motor truck frame, so that, upon jacking up the truck, the wheels could be rolled out. This was an essential feature, recognized by all truck builders, and has been embodied in every successful truck which has been constructed.

Up to this time brakes have been invariably hung from the body of the car. But it was soon found that brakes upon electrics were a very much more important feature than they had been upon horse cars. The high rates of speed and greater weight of the cars not only made stopping more difficult, but the shortness of stops to avoid accidents was found to be important. The brakes were first suspended from the sills of the car, and the sinking of a body under a load left the shoe so far from the wheels that, in applying the brakes, the slack of the chains was increased and could not be taken up without considerable delay. The remedy was simple, and consisted in suspending the brake rigging from the axle box frame in such a way that it was not subject to the action of the body springs.

The change in the brake rigging from the car body to the truck frame brought another evil which had been of slight importance heretofore. This was the longitudinal rocking or pitching of the car body, technically known as galloping, which was greatly increased under higher speed, and is also further increased by lengthening the car bodies. This motion is not only excessively unpleasant to passengers, but very destructive to the trucks, motors and track. When the brakes were hung from the car body, it was possible to check this oscillation by a slight application of the brake; but the change in the hanging of the brake made this impossible, and remedies became imperative. The first thing that was done as a remedy was to increase the wheel-base, but this did not prove to be of much advantage. The first success as a remedy appears to have been made by extending the sides of the truck, and on the extension pieces mounting an elliptic or half-elliptic spring. The latter method with the half-elliptic spring has been the most successful preventative tried. The necessity for overcoming the oscillation was considered so important, and the success of this device so great, that a series of inventions were, and are being, brought out for the purpose of accomplishing the same result. Numberless combinations of elliptics and spirals, and springs of various kinds, were made, and also a large number of inventions involving the use of levers, cross-equalizing bars, and other similar mechanical devices have been made, some of which appeared to succeed, but in most cases failed to produce a satisfactory result. Some of these devices in overcoming longitudinal oscillation very frequently caused the car to ride very stiffly and produced an undesirable effect upon the track. Others gave the car too much lateral motion, apparently, by the conversion of the longitudinal oscillation into a side or lateral movement. The so called extended spring-base, which is combined with the half-elliptic springs, has, in my judgment, been the best solution of the problem up to the present time. It is conceded that the equalization of the wheels to carry the load according to the practice on steam roads is out of the question with a car which has only four wheels.

As time went on and experience was gained, one point was gradually made more and more evident, which was that a motor truck was a locomotive in every sense of the word, and for success must be governed in its construction by the same general principles that are involved in the construction of a locomotive machine. The greatest difference between the functions of a motor truck and a locomotive seems to be the fact that the motor truck carries the load instead of drawing it. It also has to preserve its propelling machinery in perfect alignment while it is moved forward by the revolutions of its axles, and is subject to combined vertical, horizontal and twisting strains of the most severe kind, and at the same time it must ride as easily as a carriage. It has been demonstrated that a composite truck frame is a failure, because of its inability to stand all the strains imposed upon it. The braces, which were amply sufficient to carry the weight, give it no strength to resist twisting strains; then, again, malleable iron parts break, bolts and nuts become loose and rattle, and it is next to impossible to prevent rivets from shearing and bars from twisting out of their place. The composite frame demonstrated its imperfections with the locomotive years ago, and has been found even less successful as a form of construction for a motor truck. This is due, in a measure, to the fact that, on account of cost, first-class workmanship is out of the question in building a low-priced truck. The truck frame, consisting of a solid forged bar, of course, gives greater strength to resist strains thrown upon it from all directions than any form of a built-up truss.

Now, as a result of the best information and from large experience, I believe the ideal four-wheeled truck for electric cars at the present time is one having the fewest number of parts in its construction, in which the side pieces of the main frame are single forged bars connected across the ends by bars either bolted or welded on so as to make the frame one continuous piece. This frame is carried by springs, from the journal boxes, and itself carries an upper cord, likewise a continuous rectangular piece which has suitable seats for the springs. This upper cord is recessed to take the bolts and spring seats, and leaving its upper surface flush. The ends are carried by the half-elliptic springs, while the spirals are placed at the journal boxes. The brake should be hung by links.

Diagonal bracing, on account of the motors, is out of the question in the construction of a truck, but the diagonal strength is usually increased by the introduction of transoms. Such a frame carries its machinery with a certainty of its always being in alignment with the driving axle, and as it is spring-carried, it is as light on the rails as any form of single truck, while the longitudinal oscillation is prevented by the peculiar effect of the half-elliptic springs, which do not respond readily to rhythmic motion. So much for the form of construction of a good type of four-wheeled trucks, but what of the disadvantages of four-wheeled trucks in general. Taken at its best, the four wheeled truck is an uncomfortable carriage and a veritable track destroyer, and should only be used, according to the best judgment of many of our wide-awake railroad men, where cars are run at comparatively slow speed, and with moderate length of car bodies. Where it is desirable to run at higher rate of speed in suburban service, the damage to the track becomes so great that it should preclude its use. The increased length of wheel-base made necessary makes it hard on curves.

The only alternative is to use a double-truck car with swivel or pivotal trucks. The advantage of this form of truck is very great, and while nearly every one is familiar with its good qualities in a general way, I hope I may be pardoned for going into details which are not so well known. They are easy on curves to a degree that would hardly be credited by those who have only been familiar with four-wheeled cars. The greater number of wheels not only reduces the weight on each wheel, but correspondingly reduces the blow when the wheels strike a joint or a low place in the track. This is still further diminished by what is known as "equalization," which practically places the

car body at the central point of the truck, so that each wheel in rising or falling, in passing over any imperfection in track, elevates the load a distance but half as great as its own rise.

Oscillation, whether longitudinal or transverse, can be completely done away with by the use of double trucks. While the trucks conform closely to all the irregularities of the line, the body can move forward with but very little influence from them. The conditions, however, are not altogether in favor of the pivotal truck. As, for instance, if all the weight is used for adhesion, it is twice as expensive in use as a four-wheeled truck. If two motors are used, it only has 50 per cent of the propelling power. In its ordinary form it makes a wide body necessary, and hence is out of place in narrow streets or places where traffic is very heavy. It also has the disadvantage of putting the body at a greater height than is necessary with four wheels.

But it meets a great many of the requirements for fast suburban service, and has been indorsed with great satisfaction; but the objections which I have just mentioned preclude its use in many cases where it would have otherwise been desirable. Now the remedy for nearly all these objections has been found in what is known as the maximum traction truck.

The maximum traction truck may be defined as a pivotal truck, in which the load is eccentrically placed in relation to the four wheels; two of them receive only a sufficient amount of weight to keep them upon the track, while the others take the remainder of the load. In practice, it is found that 80 per cent of the weight may be placed on the driving wheels, while 20 per cent is used for guiding. Upon applying these trucks it was found that it was not necessary to have the wheels of equal size; that a large pair of driving wheels and a small pair of idle wheels can be used. The large pair used as driving wheels, being very near the pivotal point, have a comparatively small amount of swing, and can be allowed to rise within the floor timbers, while the small wheels, moving through a much greater arc, easily clear the sills. By this form of construction, the body can not only be brought down, but the frame can be made as narrow as in the ordinary street car body. This form of truck enables the car to be utilized for both street and suburban service. It is also found in its latest form utilized under long open cars. It carries the motors in a satisfactory manner, guides readily and answers nearly all the requirements of the service. But the question of what form of truck answers interurban service is one which every railway manager must study for himself. This becomes necessary, because the conditions on different roads vary so much that there are scarcely two in the whole country upon which they are identical. The question of the amount of traffic and the headway which is desired to run cars involves a careful study. With heavy traffic and frequent stops, it is necessary to have low cars, from which ingress and egress are easy. An extra step will increase the danger to passengers very much. On the other hand, where passengers are carried a considerable distance without stops, long cars with more than one step are permissible.

As interurban service is almost equivalent to that of the steam roads for this service, pivotal trucks having regular swing beams, equalizers, elliptic spings and all the parts of the steam road truck are entirely satisfactory. They take curves easily at a high rate of speed. But for trucks which must run not only on trams, but on T rails, some form of the maximum traction truck will give, all things considered, the best service.

In conclusion, let me call attention again to this very important question to be considered in connection with the adoption of single and double trucks, which is whether the punishment to the track by single trucks is not so great as to more than make up for the cost of putting in and running double trucks under cars of all lengths of bodies, whether short or long.

A Lightning Flash.

Mr. I. H. Farnham, electrical engineer for the New England Telephone and Telegraph Company, is an enthusiastic amateur photographer. As the problems of electricity form his professional life, it is not strange that he should point his camera at the clouds during thunder storms and catch the impress of the lightning flash. The accompanying illustration is from a photograph made by Mr. Farnham from the piazza of his house at Wellesley, Mass., one evening last September. He thinks that one of the flashes shown is the best he has yet seen photographed. Mr. Farnham might have arranged a phonograph to catch the clap of thunder which followed the flash he photographed. It must have been a regular crash.

PHOTOGRAPH OF A LIGHTNING FLASH.

KIND WORDS.

WANTS IT "STRAIGHT."

TO THE EDITOR OF ELECTRICAL REVIEW:

Inclosed find check for $3, for which please send me the ELECTRICAL REVIEW for one year, commencing with the issue of October 11.

I have been a subscriber to the REVIEW for two years through the newsstands, but have not been getting it regularly, and so decided to order it straight. H. E. MURTY.

November 7.

FINE OF ITS KIND.

TO THE EDITOR OF ELECTRICAL REVIEW:

I think the ELECTRICAL REVIEW is as fine a paper of its kind as there is printed. C. S. BRUSH.

November 8.

Henry Wood, a motorman, has sued the Milwaukee, Wis., Electric Railway and Light Company for $25,000 for alleged breach of agreement.

Detroit Electrical Works.

Upon inquiry in Detroit, the Boston *News Bureau* is informed that the affairs of the Detroit Electrical Works have been wound up, and that nothing can now accrue to either the old creditors or the stockholders of the company, though it is possible they may become interested in the final issue of a suit brought by Mr. Hugh McMillan against Boland and Barnaby should the large judgment already obtained by Mr. McMillan be confirmed and found to be collectible.

All efforts for a reorganization of the company having failed, the Court some time ago ordered a sale of the property and assets and a termination of the trusteeship—L. Warfield and W. A. Jackson, trustees. Mr. Hugh McMillan purchased the property at public auction, and the entire plant has been placed upon the market to be sold in isolated parcels. Mr. McMillan held a mortgage for $200,000 on the plant, and it was the foreclosure of this mortgage that marked the beginning of the company's end. Some time after, he canceled the mortgage, after realizing sufficient money out of the assets of the company to take up notes, etc., he had indorsed. He then endeavored to reorganize the property, but the stockholders refused to come into the reorganization.

A dispatch from Detroit states that the verdict of $285,000 obtained by Hugh McMillan against W. A. Boland, of Lynn, and F. A. Barnaby, of Brooklyn, has been set aside by the Court of Appeals, and a new trial has been ordered before Judge Steere, of Detroit, before whom the case was originally heard. McMillan sued for $750,000, claiming breach of contract.

General Electric Company To Increase Its Working Force.

A recent press dispatch from Schenectady, N. Y., states that since the election result showed that there is to be no unsettling of monetary values, the General Electric Company has been making arrangements to extend its plant in Schenectady and to increase its force of about 5,000 hands. The company has let a contract for a building 296 feet by 100, to be constructed of brick. Specifications are being drawn, it is said, for still another building for the company's works, 196 feet by 100.

Baker & Company Make a Large Purchase.

Baker & Company, the platinum magnates, of Newark, N. J., on the day after election closed a deal by which they purchased $170,000 worth of crude platinum. This deal was contingent on the election of Major McKinley.

Westinghouse Company To Work Double Time.

The Westinghouse Electric and Manufacturing Company has posted notices at its works in Brinton that it would be compelled to put its entire force of 4,000 men on full time, double turn.

Electrical Men in the Campaign.

The electrical field seems to have been especially patriotic during the campaign just closed. This was forcibly shown in the business men's sound-money parade in New York city on October 31. The Electrical Sound-Money Club, which was organized and put on its feet within a week, turned out over 2,000 men, appropriately equipped with banners, flags, badges and bands. There were probably 20 electrical companies represented in this division of the parade. The electrical journals, as a rule, have done their share toward helping the cause of sound money. There are a number of electrical contracting firms, especially in the street railway field, who have done yeoman service for the cause.

The excellent management of the Republican campaign reflects, of course, on Mr. Mark A. Hanna, of Cleveland, Ohio, Chairman of the Republican National Committee. Mr. Hanna is prominently connected with the electric railway industry, holding large interests in the street railways of several of our large cities. Mr. Henry C. Payne, vice-chairman of the Republican National Committee, is also well known as an electric railway man, having been prominently connected for years with the American Street Railway Association and president during 1894. He has large telephone interests. Mr. Garret A. Hobart, Vice-President-elect, is also well known as an electric railway man, having been connected for some years with the street railways in his own city, Paterson, N. J.

Too much credit can not be accorded to Mr. Hanna and his efficient aids for the success of the campaign just closed. It is a living example of what competent business men can do when they devote their whole time to politics. It is flattering to the electrical field to know that its representatives played such an important part in the hard work of the campaign.

Brush Electric Company Moving to Lynn.

The Brush Electric Company, of Cleveland, Ohio, which is controlled by the General Electric Company, is moving its entire plant and business to Lynn, Mass. The company will occupy the buildings formerly used by the Thomson-Houston Electric Company. The Brush company of late has been devoting itself especially to the manufacture of arc dynamos and arc lamps.

Chicago Electrical Association.

The next meeting of the Chicago Electrical Association will be held on November 20. Mr. E. L. Andrews will read a paper entitled, "Daily Problems in Long-Distance Telephony."

A London dispatch says that the London *Financial News* warns investors that elevated railroads have seriously impaired profits of surface railways, which has a bad effect on floating of $3,000,000 West Chicago Railway bonds.

ELECTRIC TRACTION UNDER STEAM RAILWAY CONDITIONS.

A TOPICAL DISCUSSION BEFORE THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK, OCTOBER 21, 1896—OPENING REMARKS BY DR. CHAS. E. EMERY.

In accepting an invitation to open this discussion upon general lines, it appeared necessary to make an investigation to ascertain in a general way the outcome of an attempt to introduce electric traction on our trunk line railways, in view of the rapid improvements that have been made in electrical apparatus, and the reduction of cost that has followed the greater demand.

In the light of recent achievements, it can be assumed at the outset that electric traction under steam railway conditions is feasible. The only question is whether it will pay. The present applications only prove the former proposition, but do not touch the latter.

Electric traction on street railways was commercially successful because it gave increased power by comparatively simple means, and the actual cost of operation was less than formerly with horses, so that the saving in this respect, and the increased travel due to better facilities, warranted the enormous development which has taken place in this direction. The application of electric locomotives for suburban traffic underground, as on the City and South London Railway and on a branch surface road to Nantasket Beach, near Boston, with other somewhat similar applications, show the practicability, desirability and financial success of electric traction for such service. The Baltimore tunnel application shows that electric power may be transmitted and utilized in very large units successfully, and the freedom from escaping gases warrants the application at that particular location without further investigation. In suburban traffic, a certain flexibility is necessary, by which large crowds may be taken when desired; and if the comfort of the transit can be so increased as to make frequent trips desirable to travelers, the business will be built up and the heavy expenditures necessary to change to electricity be compensated for in this way, even on the present steam-operated roads for considerable distances from large business centers. It does not seem probable, however, under present conditions, that any probable increase of travel will warrant the enormous outlay necessary to secure electric traction throughout the whole length of our trunk railroads.

The greatest practical efficiency of an electric system of the kind proposed between the engines at the central station and the rails would probably be 60 per cent. This, on account of a second transmission to sub-stations and the necessity of using rheostatic regulation to some extent, would probably be reduced to 50 per cent, so that twice as many horse-power would need to be generated at the central station as at the track with the present steam locomotives. Each horse-power in the central station will be developed for two pounds of cheap coal or four pounds per net horse-power delivered, whereas the steam passenger locomotive will, on the average, require six pounds, based on net tractive force and allowing for the various wastes. The saving in coal, due to electric passenger traction, will, therefore, be one-third. Coal is procured cheaply by the railroads, but probably an inferior quality, costing 50 cents per ton, or, say, 25 per cent less than that used on locomotives, could be employed in the electric stations, so that, for trains of like weight, the saving in cost of coal for passenger would be $\frac{1}{4} \times \frac{2}{3} = \frac{1}{6}$. For freight engines we calculate the saving in cost for fuel will be about 55 per cent, and for switching engines about 66⅔ per cent. On railroads running through the coal regions the total cost of coal is about 9 per cent of the total operating expenses. A saving of one-half in the cost of the coal, then, corresponds to a saving of 5 per cent of operating expenses. For reasons that will be stated later, it is believed that, for general railroad work, independent electric locomotives will be required, and that these will necessarily be as heavy as present steam locomotives, on which basis the only saving in weight will be that of the tender, which we have assumed as 10 per cent of the total weight of the train for passenger engines, 3.3 per cent for freight engines, and 5 per cent for switching engines. The total load to be hauled will therefore be decreased by these several percentages, and the cost of coal reduced thereby to 45 per cent of that required by the present locomotives for passenger trains; 43½ per cent for freight trains, and 32 per cent for switching trains. Applying these percentages for the relative amounts of coal used for these different purposes on a prominent railroad, the average saving in fuel becomes 58.9 per cent, or 5.89 per cent of operating expenses. The cost of water is taken at two-thirds of one per cent, on the same basis which increases the saving to 6.56 per cent.

Considerable savings have been claimed on other grounds. First, in relative repairs of electric motors compared with locomotives. Repairs will be less on the motors, of course, but are not inconsiderable, and when we consider that the transmission line, trolley line and trolleys must be kept in repair as well as the motors, it can not be far in error to assume that the question of repairs will be about balanced, independent of central station apparatus otherwise provided for.

It has been claimed that labor will be saved because the second man on an electric locomotive is required simply to provide for sickness or accident of the driver, and can well be the baggageman of a passenger train or the conductor of a freight train. Something of this kind may be worked out on an unimportant country road, but it would be impracticable on a large business scale. If a trunk line were to be changed to electricity to-morrow, the best policy would be to keep the old engineers to operate the locomotives and learn of electricity as fast as possible, and to put the young men from the training schools of the large companies as the second men to watch electrical details and overcome unforeseen contingencies, the firemen taking their places as they learn how. It is also claimed that there will be a saving in the weight and cost of electric locomotives, particularly when applied under a car, but this system is of limited application. Heavy locomotives on trunk lines must have the same weight for electric as for steam traction, independent of the tender, as explained hereafter. Large savings in repairs to tracks and bridges are also claimed on account of the smoothness with which electric locomotives having no reciprocating parts would operate. The same weights must be run over the same rails at the same speed, and at least a great part of the wear and tear would be due to inequalities of the track surface, which would influence both systems alike. The present locomotives are so designed that, while the wheel loads on the drivers are heavy, the masses which strike blows are comparatively light; that is, they have simple wheels and axles, spring-connected to the frames. This is a very difficult thing to accomplish with an electric locomotive without using exactly the same construction. On a comparatively smooth track, remarkable steadiness of movement may be obtained, if the armatures of the motors are secured to the axles of the driving wheel and the fields supported concentric therewith, but such an arrangement is entirely unfitted for a railroad track in average condition. Springs only relieve the frame. Each pair of wheels and attached motor acts as an enormous trip-hammer on the rails and roadbed the moment the former gets the least out of alignment, by defect in original construction, by settling after rains, or from other causes. A connection to driving axles through gearing reduces the blows very materially, but introduces at high speed another difficulty. The vertical movements of the main axle would necessarily cause a change in the angular velocity of the armature during the time of such movement, which, for jars occurring in the fraction of a second, would bring a heavy strain on the gearing and vary the speed of the armature momentarily. The variations in current due to such variation may also give a longitudinal pulsation to the train. The matter is not helped at all by mounting the motors on hollow axles concentric with the driving axles, so that the motors may be spring-supported from the axles, for in such case the connection of the motor to axles must be through links the equivalent of a universal joint, which produce variations in velocity, when the axles are out of center with the armature, similar to those where gearing is employed. In fact, these very devices are used to obtain variation in angular velocity in many machines. Either gearing or universal joints would have back lash when current was shut off. The suggestion recently occurred to the speaker, and he has not had time to calculate the effect of these considerations, but they must be serious. A train at 60 miles an hour moves about 90 feet a second, sufficient to cover a number of yielding rail joints in that time. When the New York Central Railroad started its fast trains, the engineer found it necessary to go over the alignment with instruments, as dips and vertical curves, which would not be noticed by the trackmen, gave very unpleasant motions to the cars at high speed.

For reasons above given, it will be necessary to mount electric motors for fast locomotives away from the centers of the axles, and connect through side rods, as in the present locomotives. The only other method would be to use chains, which are mechanically impracticable. There is another important reason for this. In order to obtain speed, the motors must be wound for it so that the counter electro-motive force will be produced by velocity rather than the number of turns; and, in starting, the motors are necessarily connected in series so as to reduce the starting current. For motors adapted to very high speeds, it will be necessary to put pairs in series even to surmount heavy grades, to act as pushers in case of accident, or in removing snow, etc. The counter-electro-motive force is therefore divided between several motors, but not necessarily in equal degree. If, with motors connected to separate axles, one for any reason slips its wheels, it will monopolize the larger portion of the electro-motive force and cut down the current on all the motors in series so that full power can not be obtained. Working the motors in parallel with an enormous rheostat would be wasteful, and, in some cases, impracticable. It is, therefore, important for two reasons to connect driving wheels operated by separate motors by means of side rods.

(To be continued.)

The Watson Patent Has Expired.

TO THE EDITOR OF ELECTRICAL REVIEW:

In the United States Circuit Court here Nov. 7, a motion was made by the attorneys, R. H. Parkinson and S. S. Stout, of the Western Telephone Construction Company, to the effect that the Watson patent, No. 270,022, owned by the Bell company, and covering all forms of automatic telephone hook switches, had expired July 30, 1895, by virtue of a Canadian patent to Watson, covering identically the same invention. An order was issued accordingly.

The discovery of this patent will be a great surprise to the electrical fraternity in general, and will kill one of the greatest bugbears with which the competing telephone companies have had to cope.

The Western Telephone Construction Company were put to great expense to defeat this patent, and their efforts will not only secure them and their customers against interference from it, but opens the use of the telephone switch hook to the public.

This will also probably result in the immediate dismissal of suits against others as well.

Another good broad Bell patent gone! Very truly yours,

Western Telephone Construction Co.,
J. E. KEELYN, President.

A Hand-Book on X Rays.

The L. E. Knott Apparatus Company, 14 Ashburton place, Boston, Mass., has issued the third edition of a very valuable pamphlet entitled, "Apparatus and Methods for Practical Use of X Rays." It is the most complete circular yet issued on X-ray apparatus and its use. It refers to all the recent developments of the fad, and is distinctly up-to date. The information contained in this pamphlet will be very useful to any reader of the ELECTRICAL REVIEW who is interested in X-ray work. The pamphlet is sent free on request.

PATENTS AS INVESTMENTS.

READ BEFORE THE CHICAGO ELECTRICAL ASSOCIATION, OCTOBER 16, BY ALBERT SCHEIBLE.

Our greatness as a manufacturing nation depends so largely on the patent system which has been in force for the last 60 years, that the question of the value of patents must be of general interest. Especially is it of importance to workers in the electrical field, since the commercial side of our line shows its dependence on patents at every step. Still, among electrical people, as among others, we find quite a range of opinion in regard to the value of patents (the term being used to denote the control of patented inventions). On the one hand we find lists of patents scheduled as heavy assets by our prominent electrical concerns, while on the other hand we hear the grumbling about the worthlessness of patents issued by the United States Government and the folly of spending money in obtaining them. Of course, a patent in itself is merely a formal recognition of the inventor's originality and of his willingness to let the public have the free knowledge and use of his invention after the expiration of the 17 years during which he can defend himself against pirates. The patent in itself does not confer any value—it is merely offered in order that the inventor will disclose what is of value; so, in treating of patents as investments, we must consider the value of the patented invention as compared with the unpatented, and hence unmonopolized, one.

If we are ourselves inclined to originate new and useful ideas, we want to know if it will pay to invest money in patents as a first step in controlling their exploitation. Then, as engineers, we have the general public looking to us for guidance, so the question becomes still more important. And since every dollar improperly spent in connection with electrical work takes at least one dollar out of the reach of those who need it for promoting legitimate undertakings, hence we should all be more or less interested in checking any rash investments. Some years ago ex-Commissioner of Patents Thatcher made the claim that over half of the patents issued by our government are remunerative, but I believe he did not state how well the paying ones were averaging nor what was lacking with the balance that would keep them from bringing proper returns. Perhaps we can best get at this point by studying the features which ought to make an invention worthy of commercial success, and hence of patent protection. For while there may be no general rule of commercial success or failure which we can apply to all patented inventions, is it not plausible that those will fare best which are most worthy of success? Here, for instance, are four successward points which may or may not be noticeable in a given invention:

1. Decided originality; not merely enough to make it patentable, but sufficient to avoid the evading of such a patent by equally simple and effective devices.

2. Utility to the extent of filling a decided want (more than a mere local usefulness), so as to command a wide-spread sale under varying conditions.

3. Exploitability at the hands of the inventor or of those with whom he is in contact.

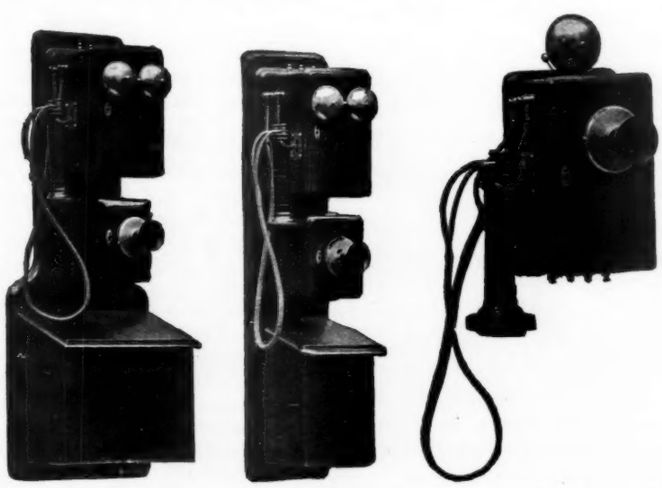
Then, as to the patent itself, there is point 4. The patent should strongly cover the invention.

These four points strike me as the ones which would usually determine the prospects of success or failure for any patent from an investment standpoint. And are they not points whose importance ought to be self-evident? It takes originality in an invention to entitle it to a patent; but a very simple rearranging of parts with an extra hook or lever may be enough for this. And if the device is easily gotten up, why should it be hard for a competitor to get up an equally effective one which would evade the patent? Only the decidedly original patents are usually hard to evade, and therefore valuable as protectors. Then we need utility to a large degree in order to find any considerable market for the patented article. The man who patented the shadow sign device for use in street railway tunnels no doubt devised an article which could prove useful in the three Chicago tunnels, but where else would he find a market for it? Then, as to the strength and breadth of patent when procured, it takes an able lawyer to weigh every word and every phrase in the application so that his client may get all to which he is entitled, and either the inventor or his attorney, or both, must have a good knowledge of the allied art and a keen insight into the future of the invention. It always lessens my opinion of a patent when I hear the inventor brag about writing his own claims and specifications, for not only do two heads think more than one, but it takes the skilled attorney to tell just what to put in and what to leave out in order that the case may be put most clearly before the examiner. And, of course, there must be some prospects of exploiting the invention, else of what use is the patent?

Briefly, you need only to ask yourself four questions: Is the invention decidedly original? Does it fill a wide-spread want? Will the proposed patent properly cover it? and, Is the inventor in position to profit by the governmental protection implied in the patent? If the invention meets these four tests, it ought to be worthy of success, and hence a good investment, but every shortcoming on any of these four points will count against it. And if a given idea will not stand the test of these four simple questions, why spend a single dollar towards patenting it? Our government issues patents because it wants the public to be benefited by new devices needed for its progress and welfare, but that does not mean that every new idea is so needed by the public. Indeed, the average thinker will strike a great many ideas which fill no decided want. He can well afford to sell most of them if he will only learn to save the one or two that are really worth exploiting, for it is only by persistent study and experiment that most of the really valuable patented inventions have been produced.

(To be continued.)

FIGS. 1, 2 AND 3.—APPARATUS OF THE PHŒNIX INTERIOR TELEPHONE COMPANY.—THREE VIEWS OF SUTTON MICROPHONE.



FIGS. 4, 5, 6 AND 7.—ILLUSTRATIONS OF ADDITIONAL PHŒNIX TELEPHONE APPARATUS.

Improvements in Telephone Apparatus Construction.

Recently the Phœnix Interior Telephone Company, of New York, with offices at 157 Greenwich street and factories at 108 Greenwich street, have perfected considerable new telephone apparatus, overcoming objections which have heretofore existed against much of the apparatus constructed by the "Independent" companies. In connection with their telephones is used the new Sutton granular carbon microphone illustrated herewith in Figs. 1, 2 and 3, which is constructed with electrodes surrounded by fabric placed opposite each other, with edges of their surrounding envelopes in contact. The microphone is fully covered by patents granted in June of this year, and assigned by George W. Sutton to the company. The microphone has been pronounced by experts as of great practical power and free from the possibility of infringements.

The illustration, Fig. 4, shows their standard two-cell exchange apparatus with 10,000-ohm magneto granulated carbon transmitter, which is being used very largely in this country and in South America. Illustration Fig. 5 shows the same instrument, except that it is constructed for a single battery. It is designed for those who desire to use dry batteries instead of wet. The single-battery boxes hold two cells of dry batteries.

For short private lines and intercommunicating service in offices, banks and factories, the small instrument, shown in illustration, Fig. 6, has been very widely adopted. The transmitter is the Phœnix company's regular long-distance microphone, with battery vibrating bell not ringing, however, over a few hundred feet. The system can be used with the desk sets and can be wired on the "Phœnix" independent switch system. The desk telephones made by this company are particularly ornamental, strong and simple in construction, designed for accurate and quick service. The illustration, Fig. 7, shows one type of the desk sets. This may be used, in connection with the company's other instruments, for the generator call.

The growth of the Phœnix Telephone Company has been so steady that some months ago the company equipped two larger establishments, one solely for manufacturing and the other for offices and salesrooms. Even with the increased facilities, since that time, the company has been unable to keep up with the tax on its manufacturing department, and are now planning to equip a factory with three times the capacity of production with the most modern machinery, for the construction of telephone apparatus.

ADVANCE INFORMATION

Valuable News and Tips for Manufacturers and Dealers.

We publish below information relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW.

Electric Light and Power.

BRUNSWICK, ME.—A plant will be erected for the purpose of manufacturing electric machinery and doing foundry work. The Fairfield Swing Company will be moved to this locality and power will be furnished by the electric light company.

LEESVILLE, CT.—The electric light plant will soon be placed in operation.

SARATOGA SPRINGS, N. Y.—J. P. Gilson & Company will probably erect a dam and install a power plant.

MCKEESPORT, PA.—The National Galvanizing Company's new plant will be placed in operation at Versailles borough, and the machinery will be operated by electricity.

WATERTOWN, MASS.—Maj. J. W. Reilly can give information concerning establishment of electric light plant.

BRIDGETON, ME.—Ex-Sheriff Webb can give information concerning establishment of electric light plant.

FRANKLIN, N. H.—Franklin Light and Power Company's new addition is approaching completion, and machinery is arriving and being placed in position.

JEWETT CITY, CT.—A. A. Young can give information concerning erection of electric light plant, for which he donated site. The sum of $6,000 has been appropriated to defray cost of plant.

BRINKLEY, ARK.—Brinkley Electric Light and Power Company has been incorporated by J. J. Ferrell, M. A. Ferrell and F. E. Sapp. Capital stock, $15,000.

SAN DIEGO, CAL.—Laguna Water and Power Company has been incorporated by J. W. Thompson, Edwin Parker, Chas. D. Long, E. E. Shaffer and H. C. Gordon. Capital stock, $3,000,000.

ABERDEEN, S. D.—Aberdeen Gas and Electric Light Company has been incorporated by Fred A. Bartholomew, John S. Bartholomew, Geo. B. Clifford, William Summers and Geo. W. Jenkins. Capital stock, $75,000.

RUSHVILLE, N. Y.—The contract for lighting this village has been let to Sylvester Kearns.

PORT RICHMOND, S. I.—The Port Richmond Electric Light Company has put in an application for a franchise to light the streets of Edgewater, making four applications in all now before the Board of Trustees of that village.

JACKSONVILLE, FLA.—The Jacksonville Electric Light Company has been sold to Arthur T. Parker and H. C. Bullard.

BURLINGTON, IOWA—Burlington Railway and Light Company has been incorporated by J. J. Ransom, G. H. Higby, E. C. Walsh, A. E Alsh, C. H. Walsh, for the operation of gas and electric light plants, etc. Capital stock, $1,250,000.

NEGAUNEE, MICH.—Major Kirkwood is interested in the construction of an electric light plant.

GENEVA, N. Y.—S. D. Willard may be addressed concerning establishment of electric light plant.

COXSACKIE, N. Y.—A company is reported to be organizing to construct an electric light plant.

BLUFFTON, OHIO—City Clerk may give information concerning proposed construction of an electric light plant.

BEEVILLE, TEX.—L. D. Rhodes is constructing an electric light plant, which is nearing completion.

COLUMBUS, MISS.—W. H. Johnson and C. B. Botton will construct an electric light plant.

CHICAGO, ILL.—Lake Lighting Company has been incorporated; capital stock, $75,000. Incorporators, Walter Olds, Charles F. Griffin and Lee M. Olds.

NEW WILMINGTON, PA.—The question of lighting the streets of this place with electricity is again being discussed.

EGG HARBOR CITY, N. J.—A franchise for the erection of an electric light plant in this city has been awarded to George Pfeiffer, of the Camden Water Power Company, who will commence the erection of the city water plant next week.

HESPELER, ONT.—The fire and light committee is contemplating some improvement in the lighting system of the town.

ARKANSAS CITY, ARK.—Articles of incorporation of the Brinkley Electric Light and Power Company have been filed with the Secretary of State; capital stock, $15,000. Incorporators, J. J. Ferrell, president; M. A. Ferrell and F. E. Sapp.

RUSHVILLE, N. Y.—The contract for lighting this village has been let to Sylvester Kearns for $192.

New Electric Railways.

BOUND BROOK, N. J.—An electric railway is to be constructed between Plainfield and this city, and Captain Edward Ives is drawing plans and specifications for same.

IRWIN, PA.—John George and C. R. Fritchman, of this place, are engaged in securing the right of way for an electric line from this place to McKeesport, to connect there with a line to Pittsburgh.

FAYETTEVILLE, ARK. — Articles have been filed incorporating the Fayetteville Electric Railway Company, with a capital stock of $50,000. F. T. Crommett, O. M. Wallace, J. W. Lipsey and J. A. Griffith are the incorporators. The object of the company is to build and operate a street railway in the town of Fayetteville.

PALMER, MASS.—Steps are being taken to obtain subscriptions for the necessary stock required to build an electric road connecting Thorndike, Three Rivers and Bondsville with Palmer. Estimated cost is $60,000.

DAYTON, OHIO — The Dayton & Miamisburg Traction Company is considering the extension of road.

BRADFORD, PA.—A trolley line will be constructed from this city to Lewis Run.

DANVILLE, QUE.—The Asbestos & Danville Railway Company will apply to the legislature for power to build and run an electric railway from Danville to Asbestos, Richmond County.

GREENVILLE, S. C.—The Paris Mountain Land Company has been incorporated by S. F. Trowbridge, Sam M. Grist, W. J. and W. F. Thackston, H. C. Markley, O. B. Cagle and others, to build a railway through Greenville to Paris Mountain, to be operated by steam, horse or electric power. Capital stock, $10,000.

OAKLAND, CAL.—Alameda, Oakland & Piedmont Electric Railway Company reported sued for $15,000 damages.

VENTURA, CAL.—E. S. Thatcher applied for franchise to construct and operate a steam or electric railroad in Ventura County, from San Buenaventura to the foot of the grade of the Upper Ojai Valley.

WARREN, MASS. — The Warren, Brookfield & Spencer Electric Railroad Company is planning to extend its line to West Warren, at an estimated cost of $18,000.

CHICAGO, ILL.—The Chicago & Des Plaines Valley Street Railway Company has been incorporated; capital stock, $100,000; to construct and operate a street railway. Incorporators, Frank Lehmann, Otto Gorke and Robert E. Williams.

New Manufacturing Companies.

SALT LAKE CITY, UTAH — Salt Lake Electric Supply Company has been incorporated by R. W. Nicol, E. Mill and S. J. Weisel. Capital stock, $20,000.

YOUNGSTOWN, OHIO—Orient Electrical Company has been incorporated by Lucius E. Cochran, Geo. M. McKelvey, Wick C. Cans, Mason Evans and A. B. Mannix. Capital stock, $25,000.

BLACK RIVER, N. Y.—The Jefferson Power Company has been incorporated to develop hydraulic and electric power, and to manufacture lumber, wood pulp and paper in the town of Wilma, Jefferson County; capital, $125,000. Directors, William P. Herring and Frederick W. Herring, of Watertown, and James H. Hiland, of Chicago, Ill.

CHICAGO, ILL. — The Electrical Exchange has been incorporated; capital stock, $10,000. Incorporators, Thad S. Lane, Ralph R. Lane and Cora L. Glasner.

SCHENECTADY, N. Y.—The Mexican General Electric Company has been incorporated to deal in electrical apparatus and to install electric plants in the Republic of Mexico and other foreign countries; capital, $50,000. Directors, S. D. Greene, Henry W. Darling, D. Mazenet, J. R. Lovejoy and M. F. Westover, of Schenectady.

PORTLAND, ME. — The Caswell Electric Company has been incorporated for the purpose of manufacturing and dealing in all kinds of electrical and other batteries, with $150,000 capital stock. The officers are: President, T. E. Eaton, of Boston, Mass.; treasurer, W. H. G. Rowe, of Winchester, Mass.

New Telephone and Telegraph Companies.

CONWAY, MASS.—The New England Telegraph and Telephone Company have decided to extend their lines to this place.

WARREN, OHIO — A franchise granted in Geauga County provides for an extension of the Madison–Jefferson–Warren telephone line to Chardon, Chagrin Falls and other places. The Jefferson – Warren branch is about completed. It takes in Kinsman and Cortland.

FRIEND BROOK, MICH. — Dan Smith and C. L. Ramsey have been awarded the contract for constructing a telephone system between this place and the village.

AUSTIN, MINN. — The Northwestern Telephone Exchange Company has received permission from the City Council to enter this place with its poles and establish an office here.

Increase of Capital.

HOOKSEIT, N. H.—The Merrimack Electric Light, Heat and Power Company have increased their capital stock to $20,000, and the company contemplate erecting an addition to present plant.

Business Troubles.

LA GRANDE, ORE.—A receiver has been appointed for the La Grande Electric Company.

TRADE NOTES.

The Progressive Supply House, Frank S. Stewart & Company, 35 North Seventh street, Philadelphia, is again offering a very substantially constructed series of knife-switches mounted on enamel slate bases at extremely low quotations. This company in a very few years has become recognized as one of the aggressive and reliable dealers in general electrical supplies.

The large factory of the Helios Electric Company, 1229 Callowhill street, Philadelphia, is operating under very heavy pressure this Fall. The new types of inclosed arc lamps and the standard makes of alternating lamps, constant-potential, direct-current lamps, have had perhaps a larger sale this season than ever before. Mr. Frank S. Marr, president of this company, speaks most encouragingly as to a splendid business year for the electrical industry.

Kindred.... ...Interests

The Kent Electric Manufacturing Company, Worcester, Mass., have perfected a compact inclosed alternating motor, designed especially for the operation of sewing machines.

The Storey Motor and Tool Company, Philadelphia, are excellently located on Carter street, with a very large mechanical equipment and business offices. This company have made some most important developments relative to specific uses of electric power for various mechanical usages.

The Lynn Incandescent Lamp Company, of Lynn, Mass., is planning a factory which will be equipped for the production of 10,000 incandescent lamps daily. This company has been doing a very large business this Fall in the restoration of used-up incandescent lamps by a method which makes them practically as good as new, at a price very much less than the original cost.

Eyanson & Armpriester, 123 North Third street, Philadelphia, are preparing plans and specifications for an unusually large amount of switchboard construction work. This company, during the past few years, have, it is said, constructed more large switchboards and important switchboard equipments than any other house in America, and their work, in a measure, has become the standard for electrical constructors. They are represented in the West by the Metropolitan Electric Company, of Chicago.

The Electric Appliance Company are meeting with large success as the general western agents for the Taunton Copper Manufacturing Company, and are now carrying a large and complete stock of their celebrated bare copper wire. The Electric Appliance Company state that their customers seem to appreciate the advantage of having a complete stock of bare copper wire carried in Chicago, from which they can draw, in large or small quantities, as their needs demand.

The Jos. Dixon Crucible Company, Jersey City, N. J., in a recently issued leaflet, say: "Little, if any, of the commercial graphite in the market is fit for lubricating purposes, and bearings have been so frequently cut or ruined by its use, that there has been a very strong prejudice against its adoption by master mechanics and superintendents having charge of expensive machinery. It is safe to say, however, that when graphite is properly prepared, it will not only reduce friction much better than any oil or grease alone, but, furthermore, will perceptibly reduce the cost of lubrication." It is proper to say that the Jos. Dixon Crucible Company know how to prepare graphite for lubricating purposes.

INVENTORS who have articles of merit in the electrical or mechanical line, especially novelties, will do well to correspond with the Pacific Electric Co., La Crosse, Wis.

A TREAT FOR ARTISTS.

The Autumn scenery of the Hudson River and Mohawk Valley lends additional charm to a trip over the New York Central at this season. Fourteen fast trains every day between New York and Buffalo and Niagara Falls.

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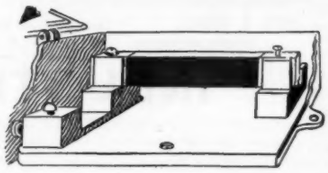

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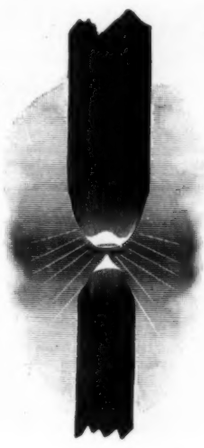

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Electrical.... Patents.

[Specially reported for this journal by E. S. Duvall, solicitor of patents, Loan and Trust Building, Washington, D. C. Copies of any patent may be secured for 10 cents each.]

ISSUED NOVEMBER 10, 1896.

570,906 Electric burglar alarm; C. Coleman, Chicago, Ill.

570,911 Electrical self-playing piano; G. H. Davis, New York, N. Y.—A music-sheet holder normally acting to move out of operative position, suitable latches for retaining said music-sheet holder in operative position, and electro-magnets arranged to operate the latches to release them from engagement with the music-sheet holder, whereby the latcher is allowed to move out of operative position.

570,914 Dynamo electric machine; G. E. Dorman, Chicago, Ill.

570,945 Electric locomotive; J. F. McLaughlin, Philadelphia, Pa.—Comprises a field-magnet shell, with inwardly projecting pole-pieces and outwardly opening recesses for receiving the field-energizing coils, an armature and commutator inclosed within the field-magnet shell and a clutch for coupling the armature to the work, also inclosed within the field-magnet shell.

570,955 Automatic safety circuit-closer; W. L. Pratt, Adams, N. Y.—An automatic cut-out, comprising a hinged arm carrying the loop connections, said arm held normally in circuit by a fuse wire, an electro-magnet and an armature for fusing said wire when the circuit upon the loop is broken.

570,967 Electric annunciator; J. Stamm, Stuttgart, Germany—Composed of a central station, push buttons, wire connections, a series of electro-magnets and electro-magnetic circuit-closers adapted to switch the electro-magnets in groups into the circuit.

571,034 Electric meter; C. Wirt, Philadelphia, Pa.—The combination with an oscillating electric motor of a retarding device, retarding the movement of the motor at the extreme limits of the swing.

571,036 571,037 Electric meter; H. Burger, Philadelphia, Pa.—The combination with an oscillating electric motor and a register, of a driving device for driving the register, which operates only on the backward or unattracted swing of the motor.

571,043 Electric motor; G. R. Green, Philadelphia, Pa.

571,059 Electric storage battery; T. W. Allan, London, England.

571,093 Multiple fuse-block; E. H. Montgomery, St. Paul, Minn.

571,097 Automatic circuit breaker; W.H. Powell, Hartford Ct.

571,099 Electrical discharge device; C. E. Skinner, Pittsburgh, Pa.—Comprises a non-conducting body having a conducting coating upon one face and two electrodes in contract with the other face, one of which is electrically connected with the conducting coating.

571,103 Lightning arrester; A. J. Wurts, Pittsburgh, Pa.—Comprises a non-conducting body and a pair of separated terminals, provided with arc-suppressing means, and located in close proximity to one surface of said body, and means for repelling the air from said surface.

571,107 Electrically controlled derails for railway crossings; J. P. Coleman, Edgewood Park, Pa.

571,109 Lightning arrester; J. P. Culgan, Swissvale, Pa.—Comprises two tongues movable toward and from each other and provided with carbon buttons, said tongues being insulated from each other, and adapted to be connected to ground, and to a line wire.

571,119 Electric switch; W. W. Hibbard, Rochester, N. Y.

571,123 Electric lamp; R. M. Hunter; Philadelphia, Pa.—Consists of a focusing arc lamp, with a reflector having a series of reflecting surfaces and located to one side of the lamp, and means to move the said reflector rapidly, so as to bring the different surfaces successively into and out of reflecting position.

571,137 Electric arc lamp; H. R. Palmer, Norfolk, Va.—The combination of the movable carbon rod of the upper corbon, a contact piece on the said rod, a contact frame adjustably clamped to and insulated from the frame-bar of the lamp and a shunting circuit leading from the outer ends of the contact frame to the main circuit, whereby the circuit is cut out of the carbons.

571,143 Electrode for secondary batteries; H. Woodward, Toronto, Canada—An electrode comprising a perforated tube, a central ribbon of lead forming a core, a filling of pellets of red oxid of lead, and plates dividing the filling of pellets into a series of layers.

571,162 Telephone switch; E. M. Harrison, Chicago, Ill.

571,181 Field magnet pole; J. J. Wood, Fort Wayne, Ind.—A laminæ or punching for a field magnet pole having its end formed with an oblique outline so as to be longer on one side than the other, and with a notch formed in the longer side.

571,190 Magneto telephone; E. M. Harrison, Chicago, Ill.

571,257 Electric heating apparatus; A. E. Appleyard, Natick, Mass.

571,270 System of electrical distribution; J. F. Kelly, Pittsfield, Mass.

571,297 Electric wall box; W. F. Bossert, Utica, N. Y.—A wall box having openings adapted to receive electric conduits, of plug-plates wedged in the openings and coinciding with the exterior and interior of the walls of the box.

571,300 System of electrical distribution; C. C. Chesney, Pittsfield, Mass.—Consists of a work-circuit containing translating devices, a dynamo having principal generating coils and independent auxiliary generating coils, and a circuit-controller consisting of a controlling transformer energized by the current from said independent auxiliary coils and supplying an electro-motive force in series with or opposition to that of the main work-circuit.

571,305 Magneto-generator; J. C. Francis, New York, N. Y.—An electro-magnetic generator, contacts, a contact lever, and a slack chain arranged to operate the lever when said chain is tightened.

571,310 Dynamo-electric machine; R. Lundell, Brooklyn, N. Y.—A dynamo-electric machine having its field cores or poles arranged with saturated and unsaturated portions.

BUSINESS NOTES.

Hugo Reisinger, 38 Beaver street, New York city, importer of "Electra" Nuernberg carbons, reports that since the election the demand for these carbons has materially increased, although the general demand is pretty steady.

The product of the Jewell Belting Company, Hartford, Ct., has become recognized, especially in electric railway power houses and electric light stations, as one of the most reliable and economical beltings with which to fill the requirements of the work demanded by the modern electrical power house.

The Hart & Hegeman Manufacturing Company, Hartford, Ct., speaks of a most encouraging outlook for its line of switches. This company has recently perfected a new single-pole, 10-ampere, 500-volt switch for electric-car heaters, with a diameter at the base of three inches, and capable of breaking the circuit at four points.

A. K. Warren & Company, electrical engineers, 451–453 Greenwich street, New York city, in connection with their construction work, have perfected an extension holder for use with the brushes on commutators, the idea being that a large waste has heretofore been permitted by the inability to hold a brush after it is worn. The company have also perfected a machine by which commutators are turned down without removal from the fields of the dynamos or motors.

The Scott & Janney Electric and Manufacturing Company, 1707–1709 Filbert street, Philadelphia, Pa., is soon to erect a large building in the suburbs, which it expects to occupy next Spring. This company has made some important advances in a system which is claimed to have many advantages over both the direct-current and polyphase alternating systems, with motors which are light, powerful, and are positively load-starting and operating at any speed. This company is also manufacturing desk and ceiling fans which operate without commutators or brushes.

The Glens Falls Paper Mills Company, of Glens Falls, N. Y., are making extensive improvements in their various plants, and have placed the order with the Berlin Iron Bridge Company, of East Berlin, Ct., for a new pulp mill at Cadyville, N. Y., including water tower and boiler-house. They have also placed an order with the Berlin Iron Bridge Company for additional buildings for their Kent's Falls plant, consisting of a pulp mill, boiler-house, barker-room and wood-room. The contract is a large one. Orders for machinery for equipping the various buildings will be placed at once.

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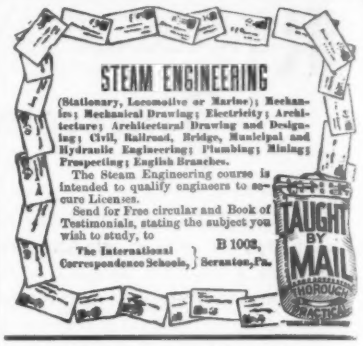
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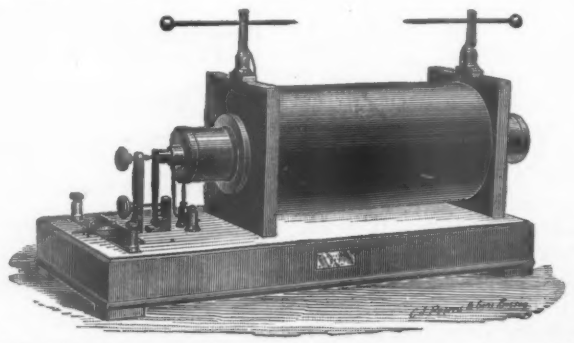

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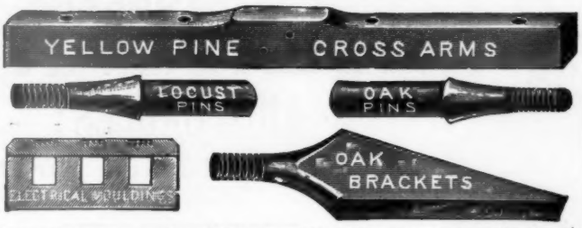

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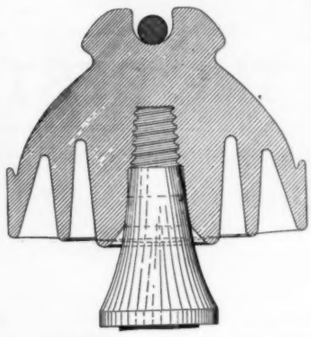

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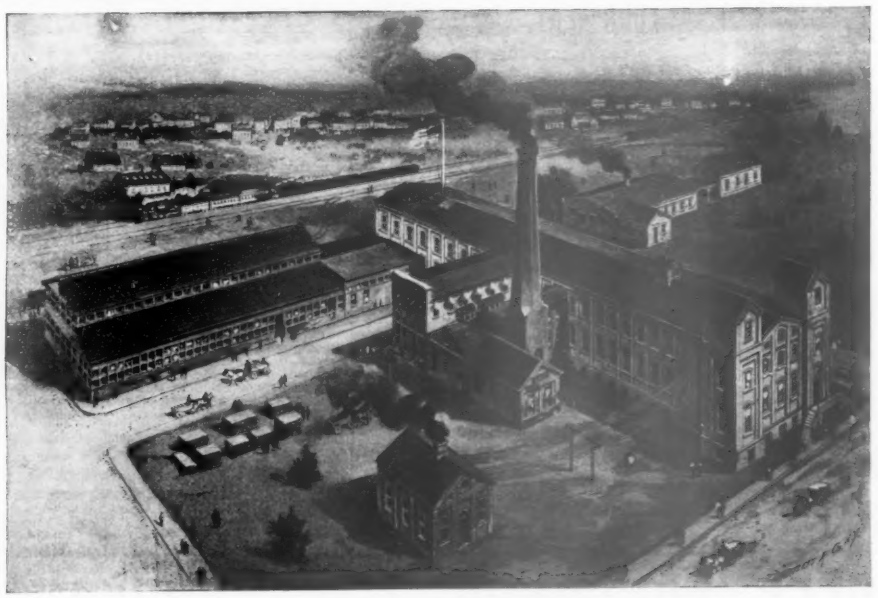

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